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UK METEOROLOGICAL OFFICE
GLOBAL DATA MONITORING REPORT

August 2002

Data Assimilation
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1. Introduction

As the WMO-appointed lead centre for monitoring surface marine data, the U.K. Meteorological Office produces monthly statistics on the quality of these observations received at RSMC Bracknell. This report includes this information along with statistics for most other types of data. The figures and tables contained herein are presented according to the agreed standards for the exchange of monitoring results.

The report is based on data received at the UK Meteorological Office Headquarters, Bracknell in time for inclusion into the appropriate analysis (the current cut-off time is approximately 7.2 hours after each analysis time). The evaluation of data quality is based on comparison with the appropriate 6-hour global model forecast (background) field, although to provide background values valid at the observation time for non-main hour data, time-interpolation of the T+3, T+6 and T+9 forecasts is used; and for sea surface temperature the background field is the analysis from the previous day. Generally, the background field is of high quality except in data sparse areas, tropical regions and areas close to steep orography where care should be taken in interpreting the statistics shown.

Comments or queries on the report are welcome and should be addressed to:-

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2 Global Data Monitoring Statistics

Ships, Fixed buoys, Platforms and Drifting buoys observations

TABLES 1 and 2 contain lists of the stations which are considered to have returned suspect observations of pressure, windspeed, wind direction or sea surface temperature, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 1 and 2 show 10 degree lat/long box average numbers of SHIP/SYNOP and DRIFTER observations received per day throughout the month at Bracknell and assimilated into model runs. All data are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

Synop Observations

Table 3 contains a list of stations which are considered to have returned suspect observations of Pressure during the month. The criteria for quality control are given in the header page. The reporting practice of each station is included in the list of statistics.

At the UK Met. Office, we monitor SYNOP pressure after it has been interpolated to our Global NWP Model's surface height. For most synoptic stations (about 75%), the surface pressure (at the model surface) is calculated from the reported station-level pressure, or, if this is not available, the height of a standard pressure-level (e.g. 850 hPa or 700 hPa). If neither of these are available, or if the reported station-level pressure is deemed unreliable, the reported mean sea-level pressure is used (about 25% of SYNOPs).

Aircraft observations

Tables 4A (300-150 hPa) and 4B (1000-301 hPa) contain lists of statistics calculated from data received from all airline carriers.

Figures 3A (300-150 hPa) and 3B (1000-301 hPa) show 10 degree lat/long box average numbers of aircraft reports in AIREP/AMDAR code (including AIREP, ACAR, AMDAR, ASDAR and ADS) received per day throughout the month at Bracknell and assimilated into model runs. Observations with a vector wind difference (compared with the model background field) of $>60 \text{ m s}^{-1}$ have been excluded. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5 , then 0 is plotted.

Figures 4A-7A (300-150 hPa) and 4B-7B (1000-301 hPa) show wind statistics for AIREP/ASDAR in AIREP/AMDAR code (including AIREP, ACAR, AMDAR, ASDAR and ADS). Observations with a vector wind difference $> 60 \text{ m s}^{-1}$ have been excluded. Statistics have not been calculated for 10 degree lat/long boxes containing <31 observations.

Figure Parameter

- 4 Mean wind vectors
- 5 Mean observation - background wind vector
- 6 Mean observation-background speed (m s^{-1})
- 7 RMS observation-background vector (m s^{-1})

Radiosonde Observations

TABLES 5-7 contain lists of the stations which are considered to have returned suspect observations of geopotential height, vector wind or wind direction, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 8 and 9 show 10 degree lat/long box average numbers of TEMP 500 hPa GEOPOTENTIAL HEIGHT and TEMP/PILOT 300 hPa WIND observations received per day throughout the month at Bracknell and assimilated into model runs. Data from all hours are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5 , then 0 is plotted.

APPENDIX I shows details of the gross error limits used in TABLES 5 and 6 and the weights used in the RMS values in TABLE 5.

Satellite Observations

Figures 10-24 show satellite wind statistics for all geostationary satellites. All plots other than **AVAILABILITY** show average data where there are > 10 observations in a 10 degree lat/long box.

Figure	Parameter Plotted	Layer (hPa)
10	Availability/average daily number	701-1000
11	Vector mean wind (observed)	701-1000
12	Observation-background vector wind difference	701-1000
13	Mean observation-background speed differences	701-1000
14	RMS observation-background vector difference	701-1000
15	Availability/average daily number	401-700
16	Vector mean wind (observed)	401-700
17	Observation-background vector wind difference	401-700
18	Mean observation-background speed differences	401-700
19	RMS observation-background vector difference	401-700
20	Availability/average daily number	101-400
21	Vector mean wind (observed)	101-400
22	Observation-background vector wind difference	101-400
23	Mean observation-background speed differences	101-400
24	RMS observation-background vector difference	101-400

Figures 25-39 show sounding statistics from the polar orbiting satellite NOAA-15. Figure 25 shows the mean daily number of ATOVS soundings, and figures 26-39 show mean and standard deviation observation-background differences for brightness temperature, for selected channels.

N.B. The sounding data is bias-corrected (and thinned) before being assimilated in the UKMO NWP model.

Figure		Weighting function peak (hPa)
26	Mean	Surface (HIRS8)
27	SD	Surface (HIRS8)
28	Mean	700 (HIRS15)
29	SD	700 (HIRS15)
30	Mean	500-700 (HIRS11)
31	SD	500-700 (HIRS11)
32	Mean	400 (HIRS4)
33	SD	400 (HIRS4)
34	Mean	700 (AMSUA5)
35	SD	700 (AMSUA5)
36	Mean	300 (AMSUA7)
37	SD	300 (AMSUA7)
38	Mean	100 (AMSUA9)
39	RMS	100 (AMSUA9)

Figures 40-54 show sounding statistics from the polar orbiting satellite NOAA-16. Figure 40 shows the mean daily number of ATOVS soundings, and figures 41-54 show mean and standard deviation observation-background differences for brightness temperature, for selected channels.

N.B. The sounding data is bias-corrected (and thinned) before being assimilated in the UKMO NWP model.

Figure		Weighting function peak (hPa)
41	Mean	Surface (HIRS8)
42	SD	Surface (HIRS8)
43	Mean	700 (HIRS15)
44	SD	700 (HIRS15)
45	Mean	500-700 (HIRS11)
46	SD	500-700 (HIRS11)
47	Mean	400 (HIRS4)
48	SD	400 (HIRS4)
49	Mean	700 (AMSUA5)
50	SD	700 (AMSUA5)
51	Mean	300 (AMSUA7)
52	SD	300 (AMSUA7)
53	Mean	100 (AMSUA9)
54	RMS	100 (AMSUA9)

3 Composite Observing Systems for the North Atlantic (COSNA)

This section shows statistics for upper air (radiosonde and aircraft) and surface (drifter) data for the North Atlantic area for data received at Bracknell during the month.

TABLE 8 shows quality statistics for **Mean Sea-level Pressure, Windspeed and Wind Direction** received at Bracknell in DRIFTER code during the month for the area 10°N - 80°N, 85°W - 0°W.

TABLE 9 shows quality statistics for **Temperature and Vector Wind** received at Bracknell from aircraft during the month for the area 40°N - 70°N, 60°W - 0°W.

Table 10 - 13 show quality statistics (**Geopotential Height and Windspeed at 100 and 500 hPa**) for all TEMPSHIPS in the area bounded by 0°N - 90°N, 100°W - 40°E and selected TEMP stations within the same area.

Revisions

1. May 95 Monitoring statistics for NOAA-11 removed. Figures 25-27 now show data for NOAA-12
2. May 95 Notes giving details of observations included in wind direction statistics clarified and corrected.
3. August 95 Monitoring statistics for NOAA-14 added with figures 28-30.
4. February 96 Monitoring statistics for GOES-7 have been replaced by statistics for GOES-8 and GOES-9.
5. April 96. 500 km and 120 km SATEMs replaced by 120 km resolution temperature profiles produced locally from the radiances disseminated by NESDIS.
6. February 97 Monitoring statistics for Meteosat 5 have been replaced by statistics for Meteosat 6.
7. Sept 97 Monitoring statistics for NOAA-12 removed. Figures 25-27 now show data for NOAA-11
8. January 1998. Increase in resolution of UKMO global forecast model.
9. April 1998. GOES winds ceased on 2nd March 1998, and were replaced with GOES high resolution winds from 15th.
10. June 1998. Monitoring statistics for Meteosat-6 were replaced by monitoring statistics for Meteosat-7, from 3rd June.
11. June 1998. Corrections in our processing of radiosonde data resulted in a decrease in the number of 500hPa geopotential heights in Figure 8 of about 230 per 24 hours (compared with previous reports), and a small increase in the number of 300hPa winds in Figure 9.
12. July 1998. Meteosat-5 began transmitting winds from 2nd July, at 63 degrees East (over the Indian ocean), and this data is included in the statistics.
13. July 1998. GOES-9 (at 135W) was replaced mid-month by GOES-10 (initially at 105W, moving towards 135W).
14. February 1999. Problems with NOAA-11, and TOVS data ceased to be assimilated from 26 February.
15. March 1999. UKMO introduced 3-D VAR assimilation system on 29 March, and also began assimilating ATOVS data from NOAA-15.
16. May 1999. Included statistics for ATOVS sounding data from NOAA-15.
17. September 1999. Included statistics for high resolution visible winds from Meteosat-5 and Meteosat-7.
18. October 1999. The 3-D VAR assimilation system was upgraded on 19 October, including improvements in the assimilation of ATOVS radiances, use of SSM/I surface wind speed, an improvement in the calculation of surface pressure for SYNOPS, and thinning and revision of observation errors of aircraft data.
19. November 1999. High resolution visible winds from Meteosat-5 and Meteosat-7 removed until used operationally.
20. April 2000. Aireps in Table 4 and Figures 3-7 split into ranges 300-150 hPa (A) and 1000-301 hPa (B).
21. September 2000. Corrected an error affecting the mean positions of a minority of buoys in Table 2.
22. November 2000. An error in the production of Table 6 was corrected. Previously, some sondes with suspect vector winds were being missed.
23. April 2001. Included statistics for ATOVS sounding data from NOAA-16.
24. May 2001. Included statistics for sea surface temperatures from marine surface observations.

TABLE 1

MONITORING OF MARINE SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - SHIPS, FIXED BUOYS AND PLATFORMS
MONITORING CENTRE: BRACKNELL
MONTH: August 2002

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for ships, fixed buoys and platforms.

Standard of comparison :Background field from UKMO global model.

Observation times :00, 06, 12, 18 UTC

Elements monitored :Mean sea level pressure (hPa).
:Wind speed (m s^{-1}).
:Wind direction (Degrees).
:Sea surface temperature (Degrees).

Parameters monitored

:NOBS :Number of observations received excluding duplicates.

:PGE :Percentage of observations with gross errors.

:%REJ :Percentage of observations flagged excluding those with gross errors.

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors.
N.B. a positive bias indicates the wind observation is veered to the background.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors.

GROSS ERROR LIMIT :15 hPa (pressure)
:25 m s^{-1} (vector wind)
:10 degrees (sea surface temperature)

SELECTION CRITERIA :NOBS ≥ 20 , and one or more of the following:

1. bias	≥ 4 hPa	(pressure),
	$\geq 5 \text{ m s}^{-1}$	(wind speed),
	≥ 30 degrees	(direction).
	≥ 3 degrees	(sea surface temperature).
2. SD	≥ 6 hPa	(pressure),
	≥ 80 degrees	(direction).
	≥ 5 degrees	(sea surface temperature).
3. PGE	≥ 25	

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed $> 5 \text{ m s}^{-1}$

IDENTIFIER	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
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MEAN SEA LEVEL PRESSURE

BBXX KS0	P	466	0	100	4.1	4.6	6.2
BOAB	P	31	0	77	2.9	-4.3	5.2
CG2556	P	24	38	67	1.2	-10.7	10.8
CG2992	P	310	46	100	3.0	-7.3	7.9
C6FN4	P	21	0	100	1.4	-12.5	12.5
DEOF	P	23	57	100	2.5	-12.5	12.7
ELZF7	P	53	0	51	3.8	4.4	5.8
KS000	P	62	0	0	1.1	11.4	11.4
KS003	P	48	0	0	0.6	5.3	5.3
KS006	P	41	0	0	0.5	7.5	7.6
KS010	P	105	0	0	0.6	4.4	4.5
KS012	P	122	0	2	0.9	5.5	5.6
KS025	P	57	0	100	0.9	8.8	8.8
LMWO3	P	22	0	55	1.2	-4.0	4.2
OUSE6	P	21	0	0	1.1	-5.2	5.3
OWDD	P	78	1	3	1.6	-4.1	4.4
TEST	P	22	0	91	2.8	-11.4	11.7
UCAC	P	36	0	0	1.1	9.5	9.6
UCJB	P	21	0	0	1.0	-4.6	4.7
UCJL	P	27	0	63	1.3	5.3	5.5
UCUE	P	25	0	4	2.4	-4.3	4.9
UDUR	P	40	63	100	0.7	13.8	13.9
UFAA	P	27	0	0	1.3	8.8	8.9
UGTY	P	24	0	4	2.3	4.1	4.7
VCZJ	P	21	0	86	2.5	4.8	5.5
V7CY9	P	51	0	92	1.4	-6.6	6.8
WE6970	P	31	3	97	1.4	8.6	8.7
0208	P	26	4	38	1.8	-4.2	4.6
8PNI	P	27	0	0	1.4	-4.1	4.3

WIND SPEED

C6LQ3	SPEED	70	3	73	5.2	5.6	7.7
DGBE	SPEED	22	0	14	4.2	6.1	7.3
DZSE	SPEED	29	0	100	3.7	6.6	7.5
ELYJ2	SPEED	38	0	76	4.6	8.1	9.4
KS010	SPEED	105	0	100	1.9	-5.0	5.3
OUSE6	SPEED	22	5	100	5.7	10.1	11.6
PPSO	SPEED	53	0	100	5.8	5.8	8.2
V2EU	SPEED	23	0	22	3.7	7.2	8.1
ZCAN3	SPEED	50	32	100	6.1	5.1	8.0
ZCBH9	SPEED	35	0	94	5.1	11.1	12.2
ZQCP3	SPEED	60	0	22	5.9	6.2	8.6
3FMM6	SPEED	64	3	100	5.2	5.6	7.6
3FWF6	SPEED	20	0	100	5.6	5.0	7.5
44145	SPEED	235	0	100	4.2	5.0	6.5

WIND DIRECTION

CGJK	DIRN.	110	0	0	89.1	19.0	91.1
ZCAN3	DIRN.	24	67	0	79.1	40.2	88.8
51306	DIRN.	27	0	0	87.1	62.2	107.0

SEA SURFACE TEMPERATURE

BBXX KS0	SST	358	39	100	1.4	0.0	1.4
CGBX	SST	20	70	70	0.7	2.0	2.1
CGDX	SST	212	29	100	1.8	1.1	2.1
CGTF	SST	186	21	95	2.3	5.9	6.3
CG2350	SST	226	28	100	1.3	-0.5	1.4
CG2522	SST	524	100	100			
CG2992	SST	262	100	100			
CG8048	SST	50	96	100	0.1	1.5	1.5
C6MS4	SST	28	0	100	0.9	-3.9	4.0
DBBX	SST	576	25	100	1.1	0.2	1.2

IDENTIFIER	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
SEA SURFACE TEMPERATURE							
DIXX	SST	74	1	46	2.4	3.5	4.3
DQVO	SST	38	0	58	2.0	3.6	4.1
FNJI	SST	110	0	58	1.2	3.0	3.2
H3VK	SST	22	0	100	1.9	-3.4	3.9
H9RS	SST	68	38	100	2.1	5.7	6.1
KRPB	SST	54	0	100	0.8	-5.3	5.3
KS000	SST	32	53	100	1.7	-0.1	1.7
KS003	SST	57	100	100			
KS007	SST	140	100	100			
KS014	SST	21	33	100	2.9	1.8	3.4
KS025	SST	42	76	76	1.3	-0.9	1.6
LAIP5	SST	31	0	39	1.9	-3.8	4.3
LF5T	SST	98	100	100			
OUGY	SST	23	9	87	2.4	3.7	4.4
SWYM	SST	23	0	91	1.0	-5.9	6.0
TSLN	SST	149	0	84	1.1	-4.7	4.8
UCBP	SST	23	0	87	2.0	-5.8	6.1
UCMP	SST	29	0	45	1.5	-3.9	4.1
UCOY	SST	26	0	96	2.3	-3.1	3.9
UCOZ	SST	34	6	44	2.3	-3.0	3.8
UCUO	SST	25	44	44	1.7	0.0	1.7
UHOM	SST	22	0	100	1.1	-4.6	4.7
UIAG	SST	26	38	65	4.2	-5.2	6.7
VGNW	SST	34	29	100	1.4	0.5	1.5
VGPY	SST	24	25	42	3.1	-0.3	3.1
VOCJ	SST	214	0	100	2.0	3.3	3.8
WCW9126	SST	56	96	100	0.5	1.0	1.1
WPGJ	SST	30	0	7	0.8	-3.0	3.1
WWU8	SST	21	100	100			
ZCBQ2	SST	29	0	97	1.2	5.8	6.0
23094	SST	55	2	76	1.9	-3.3	3.8
3FMA4	SST	26	0	31	3.4	3.1	4.6
3FMM6	SST	49	0	100	0.7	-3.8	3.8
45140	SST	233	100	100			
45141	SST	620	83	100	1.0	8.0	8.0
45147	SST	516	100	100			
45148	SST	535	100	100			
45152	SST	621	100	100			
45160	SST	623	0	38	2.3	-3.0	3.8
46131	SST	611	100	100			
46146	SST	237	100	100			
46181	SST	608	100	100			

TABLE 2

**MONITORING OF MARINE SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - DRIFTING BUOYS
MONITORING CENTRE: BRACKNELL
MONTH: August 2002**

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for drifting buoys.

Standard of comparison :Background field from UKMO global model.

Position :Average latitude and longitude for period.

Observation times :00, 06, 12, 18 UTC

Elements monitored :Mean sea level pressure (hPa).
:Wind speed (m s^{-1}).
:Wind direction (degrees).
:Sea surface temperature (degrees).

Parameters monitored

:NOBS :Number of observations received excluding duplicates.

:PGE :Percentage of observations with gross errors.

:%REJ : Percentage of observations flagged excluding those with gross errors

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors.
N.B. a positive bias indicates the wind observation is veered to the background.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors.

GROSS ERROR LIMIT :15 hPa (pressure)
:25 m s^{-1} (vector wind)
:10 degrees (sea surface temperature)

SELECTION CRITERIA : NOBS ≥ 20 , and one or more of the following:

1. |bias| ≥ 4 hPa (pressure),
 $\geq 5 \text{ m s}^{-1}$ (wind speed),
 ≥ 30 degrees (direction).
 ≥ 3 degrees (sea surface temperature).

2. SD ≥ 6 hPa (pressure),
 ≥ 80 degrees (direction).
 ≥ 5 degrees (sea surface temperature).

3. PGE ≥ 25 .

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed $> 5 \text{ m s}^{-1}$

IDENTIFIER	LAT.	LONG.	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
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MEAN SEA LEVEL PRESSURE

21534	43.8	138.7	P	729	100	100			
23562	7.0	85.5	P	491	100	100			
25571	85.8	173.1	P	155	34	77	2.8	4.7	5.5
41665	40.5	-46.3	P	818	0	100	1.0	11.1	11.1
61664	41.9	28.0	P	222	0	100	0.5	-5.9	5.9
62697	49.0	-10.5	P	693	43	75	5.7	3.3	6.6
74519	-59.9	-12.6	P	309	41	68	7.9	0.8	8.0

WIND SPEED

23924	11.4	85.3	SPEED	154	6	100	2.1	13.2	13.3
52537	21.6	148.3	SPEED	639	0	100	3.2	-5.6	6.5

WIND DIRECTION

21535	26.2	153.3	DIRN.	340	1	0	14.3	-31.5	34.6
23924	11.4	85.3	DIRN.	126	7	0	10.8	78.3	79.0
41532	23.4	-72.2	DIRN.	252	1	0	13.1	31.7	34.3
41536	22.7	-68.1	DIRN.	170	1	0	24.9	51.0	56.7
41648	25.7	-70.9	DIRN.	233	1	0	26.4	62.7	68.0
41667	27.6	-74.6	DIRN.	131	0	0	33.0	35.1	48.1

SEA SURFACE TEMPERATURE

12516	19.6	37.2	SST	120	46	47	1.0	0.0	1.0
16940	-42.6	62.9	SST	545	0	100	1.2	-3.5	3.7
16942	-42.4	59.7	SST	643	0	84	1.5	-4.5	4.7
23949	5.9	80.6	SST	97	60	100	2.1	-7.9	8.2
32526	-0.4	-96.9	SST	115	100	100			
33629	-42.1	26.2	SST	288	0	100	0.9	3.9	4.0
44504	45.8	-43.0	SST	222	100	100			
44512	49.4	-35.6	SST	115	0	100	0.4	3.1	3.1
44772	58.2	-37.5	SST	587	2	100	1.3	8.4	8.5
44778	49.0	-1.8	SST	298	36	36	0.5	1.2	1.3
46972	19.1	-131.2	SST	204	0	100	0.4	3.6	3.7
51912	-2.7	-155.9	SST	28	100	100			
52606	32.7	144.1	SST	255	78	82	3.3	-1.0	3.5
55905	-54.7	-122.9	SST	679	0	100	0.3	3.3	3.3
61536	34.0	35.6	SST	37	0	100	0.3	4.0	4.0
74520	-59.3	-21.8	SST	291	30	44	3.0	1.5	3.4

Figure 2. DRIFTER mean daily count. AUGUST 2002
Main hours only
Global average number of observations in 24 hours = 9962

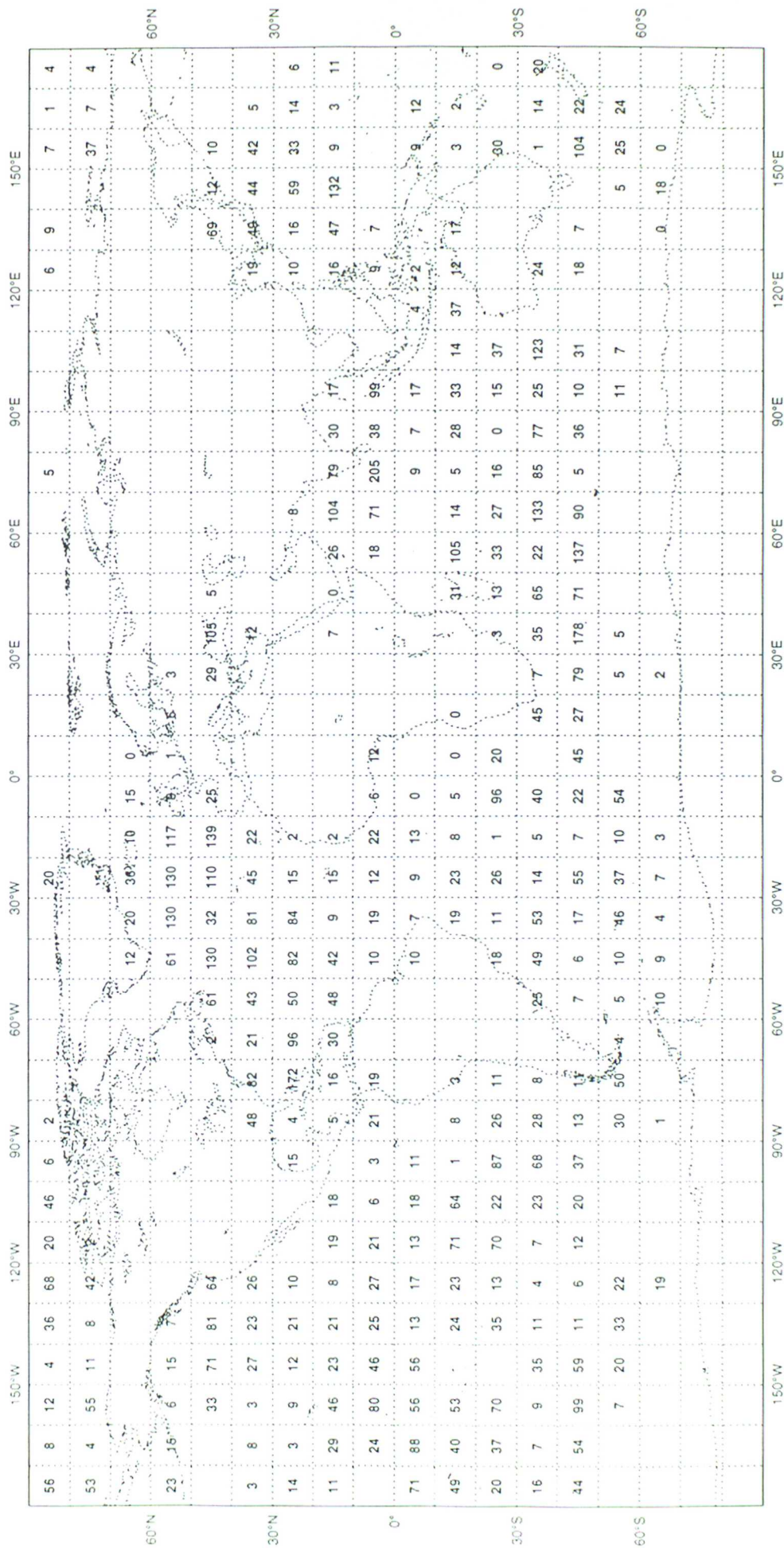


TABLE 3

**MONITORING OF LAND SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - SYNOPS & AUTOSYNOPS
MONITORING CENTRE: BRACKNELL
MONTH: August 2002**

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from each unique identifier for synops & autosynops.
Standard of comparison		:Background field from UKMO global model.
Observation times		:00, 06, 12, 18 UTC
Elements monitored		:Surface pressure (hPa).
Parameters monitored	:HT(m)	:Station height (in metres) as given in WMO No. 9 Vol A
	:RP	:Pressure reporting practice M=mean sea level pressure (hPa) reported. S=Station level pressure reported. 8=Geopotential height (m) of 850 hPa surface reported. 7=Geopotential height (m) of 700 hPa surface reported.
	:NOBS	:Number of observations received excluding duplicates.
	:NGE	:Number of observations with gross errors.
	:PGE	:Percentage of observations with gross errors.
	:%REJ	:Percentage of observations flagged excluding those with gross errors.
	:SD	:SD of difference of observations from background values excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors.
GROSS ERROR LIMIT	:15 hPa	(pressure)
SELECTION CRITERIA	:NOBS	≥ 20 ,and one or more of the following:
	1. bias	≥ 4 hPa
	2. SD	≥ 6 hPa
	3. PGE	≥ 25.

N.B. For stn ht ≥ 500m, mslp is that calculated from station level pressure where available.
For stn ht < 500m, mslp is that as reported by the station where available.

WMO REGION 1:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
60437	36.3N	2.8E	981	S8	68	0	0	0	0.9	-6.6	6.7
60728	36.4N	10.7E	1	MS	55	0	0	0	0.7	-8.2	8.2
63150	10.0N	43.2E	1454	M	21	0	0	0	1.0	11.2	11.2
63170	9.5N	44.1E	1326	M	22	0	0	0	0.8	8.7	8.7
63330	13.5N	39.5E	2070	MS	29	28	97	0	0.0	-14.8	14.8
63333	11.1N	39.7E	1903	MS	30	0	0	0	0.8	6.4	6.4
63334	10.3N	37.7E	2515	MS	34	1	3	3	0.7	11.1	11.1
63402	7.7N	36.8E	1725	MS	36	0	0	0	1.1	8.6	8.7
63450	9.0N	38.8E	2354	MS	36	0	0	0	0.8	5.1	5.2
63471	9.6N	41.9E	1260	MS	32	0	0	0	0.8	9.5	9.5
63478	5.9N	43.6E	295	S	21	0	0	0	0.8	5.7	5.8
63680	0.3N	32.6E	1144	S	26	0	0	0	1.2	-6.7	6.8
63801	4.9S	29.6E	882	S8	90	0	0	0	1.2	7.5	7.6
65355	9.8N	1.1E	342	MS	106	1	1	0	0.9	-13.0	13.0
67308	22.1S	31.7E	452	M	39	39	100	0			
68030	18.5S	25.6E	1071	8	74	0	0	0	0.5	4.9	4.9
68038	20.5S	26.0E	903	8	75	0	0	0	0.9	4.1	4.2
68338	26.9S	24.6E	1234	S8	55	55	100	0			
68396	26.5S	31.3E	641	S8	54	0	0	4	1.2	4.0	4.2
68558	30.9S	27.6E	1816	S8	58	58	100	0			
68575	30.0S	30.0E	1175	S8	113	113	100	0			
68754	32.5S	27.5E	899	S8	72	72	100	0			

WMO REGION 2:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
23975	60.4N	88.4E	86	7	116	115	99	0	0.0	-8.0	8.0
30554	54.5N	113.6E	995	MS	119	0	0	0	5.1	5.3	7.4
30967	49.9N	115.8E	623	MS	90	0	0	1	1.7	-5.3	5.6
36982	41.9N	78.2E	3635	S7	116	4	3	2	1.5	5.6	5.8
40713	37.4N	46.3E	1475	MS	111	11	10	1	1.9	13.5	13.6
40726	36.8N	45.7E	1384	MS	106	0	0	1	1.1	4.4	4.5
40741	36.6N	61.2E	235	MS	109	1	1	1	0.6	-4.4	4.4
41254	23.1N	57.7E	1755	S8	55	55	100	0			
41396	16.0N	48.9E	700	MS	21	0	0	0	1.3	5.5	5.7
41466	13.7N	44.1E	1402	8	26	0	0	0	0.6	-6.1	6.1
43415	8.8N	80.5E	98	S	64	64	100	0			
44416	28.6N	81.6E	720	MS	71	1	1	0	1.0	4.8	4.9
47022	40.8N	128.2E	1200	S	73	1	1	7	2.2	4.0	4.6
47127	36.9N	127.0E	16	MS	120	0	0	0	0.7	-10.6	10.6
48924	21.1N	101.5E	644	S	28	0	0	57	0.9	10.6	10.6
48925	20.7N	102.0E	550	M	45	19	42	64	0.7	-13.8	13.8
48935	19.5N	103.1E	1050	8	52	0	0	2	0.8	-8.1	8.1
51495	43.5N	91.6E	874	M	119	0	0	0	1.0	6.5	6.6
52602	38.8N	93.4E	2734	S	120	0	0	1	1.1	-5.8	5.9
52866	36.6N	101.8E	2262	S	120	0	0	0	0.9	-4.1	4.2
52955	35.6N	100.8E	3201	S	120	0	0	0	0.9	12.1	12.1
56146	31.6N	100.0E	339	S	120	120	100	0			
56462	29.0N	101.5E	2994	S	120	0	0	0	1.1	8.4	8.5
57816	26.6N	106.7E	1222	MS	119	56	47	86	6.3	-10.7	12.4

WMO REGION 3:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
80099	7.1N	70.7W	128	MS	47	0	0	0	1.4	-6.5	6.6
82181	2.0S	54.1W	146	MS	65	0	0	0	0.9	5.6	5.7
83235	12.4S	46.4W	604	MS	90	1	1	0	0.5	6.5	6.5
83332	14.1S	46.4W	826	MS	88	21	24	0	0.5	14.2	14.2
83531	18.6S	46.5W	940	MS	88	0	0	0	0.5	-7.1	7.1

WMO REGION 3:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
83836	25.5S	50.6W	837	MS	89	1	1	2	1.1	-5.6	5.7
84377	3.8S	73.3W	125	MS	94	0	0	0	1.0	4.2	4.3
84401	5.2S	80.6W	49	M	97	0	0	0	0.9	4.2	4.3
84425	5.9S	76.1W	179	MS	48	0	0	0	1.1	4.5	4.6
84455	6.5S	76.4W	281	MS	64	0	0	0	1.1	7.5	7.6
84472	7.1S	78.5W	2620	S	47	0	0	0	0.8	-5.1	5.2
84686	13.6S	72.0W	3248	S	94	0	0	0	0.9	-4.7	4.8
84688	13.7S	73.4W	3444	S	45	0	0	0	0.3	-12.9	12.9
84720	14.9S	75.0W	567	MS	47	0	0	0	0.7	5.9	5.9
84782	18.1S	70.3W	468	MS	73	0	0	0	1.7	7.8	8.0
85264	18.5S	64.1W	1998	S	55	55	100	0			
85312	19.8S	63.9W	992	S	45	5	11	11	2.0	-11.6	11.8
85406	18.3S	70.3W	55	M	115	0	0	0	0.9	4.6	4.7
85432	22.5S	68.9W	2320	S8	80	0	0	0	0.6	5.0	5.0

WMO REGION 4:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
71049	65.9N	89.5W	18	MS	119	79	66	87	7.0	8.3	10.9
72327	36.1N	86.7W	182	MS	119	0	0	0	0.6	4.6	4.6
72375	34.6N	111.2W	2291	MS	100	97	97	100	0.0	14.9	14.9
72376	35.2N	111.8W	2192	M	118	0	0	0	1.5	4.3	4.6
76243	28.7N	100.5W	250	MS	98	0	0	0	1.0	5.8	5.9
76625	20.6N	100.4W	1813	MS	41	0	0	0	0.9	-9.8	9.8
76640	20.9N	97.4W	28	MS	116	0	0	1	0.6	4.1	4.1
76658	19.2N	103.7W	494	MS	27	1	4	0	0.8	5.4	5.5
76683	19.3N	98.2W	2248	MS	79	0	0	0	0.8	4.1	4.2
76743	18.0N	92.9W	10	MS	61	0	0	0	0.8	6.2	6.3
76762	17.5N	99.5W	1265	MS	73	1	1	0	0.8	5.9	6.0
76845	16.7N	92.6W	2116	MS	81	0	0	19	0.8	4.0	4.1
76903	14.9N	92.3W	118	MS	95	0	0	0	0.9	6.2	6.3

WMO REGION 5:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
92010	6.1S	145.4E	1587	M	41	0	0	2	1.2	8.8	8.9
94130	14.8S	131.9E	120	MS	47	0	0	9	0.9	5.2	5.3
94322	20.2S	130.0E	340	MS	112	112	100	0			
94368	20.3S	149.0E	2	MS	120	0	0	0	0.6	-4.8	4.8
95815	35.1S	144.0E	72	MS	120	0	0	0	2.7	5.1	5.8
96505	3.7N	115.7E	928	S8	36	36	100	0			
97378	10.7S	123.1E	1	MS	50	49	98	0	0.0	-2.8	2.8

WMO REGION 6:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
01425	58.5N	6.5E	66	MS	98	0	0	64	3.6	-5.0	6.2
06685	47.0N	9.1E	515	MS	120	0	0	0	0.9	6.2	6.3
12140	54.4N	18.7E	2	MS	119	0	0	0	0.4	8.0	8.0
13269	44.3N	19.9E	176	MS	119	1	1	2	0.8	7.7	7.7
14554	44.9N	18.4E	140	S	58	13	22	12	0.9	-13.1	13.1
16470	36.8N	12.0E	191	MS	109	0	0	0	0.7	-4.0	4.1
17092	39.8N	39.5E	1218	S8	120	0	0	0	1.1	6.8	6.9
17203	38.9N	40.5E	1177	S8	118	0	0	9	0.8	4.7	4.8
40296	31.0N	35.5E	-350	M	104	2	2	16	1.7	5.9	6.1

ANTARCTIC:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
89004	71.7S	2.8W	815	MS	110	1	1	2	1.9	-8.3	8.5
89214	72.9S	10.1W	34	S	376	0	0	9	6.1	-0.4	6.1
89263	66.0S	66.1W	20	M	239	0	0	0	1.9	9.7	9.9
89264	71.4S	68.9W	780	S	264	0	0	0	2.0	8.1	8.3
89266	72.2S	60.3W	91	S	252	184	73	0	3.7	-13.1	13.6
89272	74.8S	71.5W	1369	S	131	131	100	0			
89512	70.8S	11.8E	140	MS	116	0	0	0	1.8	-5.1	5.4
89744	74.0S	43.0E	3353	S	261	0	0	0	0.9	8.1	8.1
89769	78.5S	168.4E	50	S	370	368	99	0	0.1	-14.6	14.6
89868	79.9S	169.8E	60	S	274	0	0	0	1.6	-4.1	4.4

TABLE 4A

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: August 2002

Monitoring procedures

Period	:One calendar month.
Data monitored	:Statistics for each airline carrier.
Area monitored	:90°N - 90°S, 180°W - 180°E.
Standard of comparison	:Background field from UKMO global model.
Observation times	:All hours combined.
Level(s) monitored	:300.0 - 150.0 hPa
Elements monitored	:TEMP in °C ; WIND in m s ⁻¹
Parameters monitored	
	:N REP. :Number of observations received excluding duplicates.
	:PG :Percentage of observations with gross errors.
	:PR :Percentage of observations rejected by quality control including rejections from the duplicate check.
	:PC :Percentage of observations with calm winds.
	:RMS :Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.
	:BIAS :Mean difference of observations from background values excluding those with gross errors in Temperature & Wind Speed.
GROSS ERROR LIMITS	:10.0 °C ; 60 m s ⁻¹ Vector Wind
SELECTION CRITERIA	:N REP ≥ 20

NB : All American ACARS data are grouped together and statistics are shown at the bottom of the table as "US ACARS". All ADS reports are similarly grouped together.

IDENT.	N.REP.	TEMPERATURE				N.REP.	WIND				
		PG	PR	RMS	BIAS		PG	PR	PC	RMS	BIAS
AAH	2619	0	38	1.2	0.1	2606	0	38	0	5.5	0.6
AAL	7192	0	32	1.3	0.1	6944	0	33	0	5.7	0.2
AAR	1659	0	6	1.4	-0.3	1627	0	7	0	7.7	0.2
ACA	3993	0	6	1.6	-0.2	3461	0	7	0	7.2	0.3
ACI	48	0	42	0.9	0.5	51	0	45	0	7.6	3.0
AEA	932	0	2	1.4	0.5	501	0	3	0	5.5	0.4
AEL	644	0	9	1.5	-0.9	501	0	11	0	7.0	0.4
AFL	663	0	2	1.8	0.4	520	1	3	0	6.5	0.3
AFR	1944	1	9	1.6	0.3	1486	0	10	0	6.9	0.5
AIS	257	0	9	1.5	-0.3	244	0	10	0	6.9	0.4
AJM	501	0	3	1.3	0.0	411	0	3	0	6.1	0.6
AJX	236	0	2	1.2	0.7	226	0	5	0	7.0	0.9
AMM	114	1	10	1.4	0.5	101	0	9	0	6.8	-0.1
AMT	1822	1	43	1.1	0.0	1821	0	44	0	5.3	-0.2
AMX	332	1	4	1.5	0.3	234	0	5	0	9.0	0.5
ANA	385	1	5	1.8	0.9	376	0	4	0	6.6	0.4
ANZ	3890	0	32	1.4	0.2	3873	0	32	0	6.6	0.7
AUA	27	0	4	1.0	0.2	21	0	5	0	3.7	0.6
AVA	251	0	3	1.9	0.8	148	0	3	0	6.5	0.7
AVE	195	2	6	2.3	1.3	106	0	4	0	7.3	2.1
AVN	137	0	47	0.9	0.5	138	0	49	0	7.2	-0.2
AZA	657	1	5	1.5	0.0	542	0	4	0	7.3	0.3
BAL	186	0	9	1.0	0.2	165	0	10	0	5.7	0.0
BAW	770	1	10	1.7	-0.2	688	0	10	0	6.2	0.4
BWA	305	1	4	1.3	0.3	206	0	3	0	5.1	0.8
CAL	101	0	6	1.9	0.2	100	0	7	0	7.6	0.8
CCA	297	2	15	2.2	0.6	318	1	100	0	9.0	0.1
CES	415	1	5	1.6	0.5	432	1	9	0	10.1	0.7
CFG	742	0	4	1.6	-0.5	559	0	5	0	6.3	0.2
CGA	26	0	0	1.0	-0.3	26	0	0	0	4.2	1.2
CGF	33	0	0	1.1	-0.7	33	0	0	0	4.0	0.4
CGH	79	0	0	1.5	-0.1	77	0	0	0	4.7	0.6
CKS	284	0	100	2.6	2.4	276	0	46	0	6.3	1.1
CLX	432	0	5	1.7	-0.4	350	0	7	0	7.3	0.3
CMI	104	1	17	2.0	0.1	102	0	15	0	6.0	0.3
COA	1017	1	41	1.3	-0.2	961	0	42	0	5.8	0.1
CPA	28	4	18	1.9	0.3	28	0	11	0	5.0	0.3
CRL	876	1	5	1.3	0.4	644	0	8	0	8.1	0.9
CSN	124	0	10	1.7	0.2	125	2	12	0	7.5	0.5
CUB	445	1	7	1.9	1.0	356	0	5	0	6.9	0.2
DAB	78	0	5	1.3	-0.2	77	0	5	0	4.2	1.1
DAI	83	0	1	1.0	0.1	82	0	1	0	4.2	0.6
DAL	3442	0	38	1.2	-0.1	3221	0	40	0	5.8	-0.1
DBR	65	0	5	1.4	-0.3	64	0	6	0	9.3	0.0
DCE	242	0	7	1.2	0.4	214	0	9	0	6.8	0.3
DHL	36	0	100	5.5	-4.8	34	0	18	0	12.0	0.8
DLH	1562	0	11	1.5	0.0	1297	0	13	0	6.6	0.6
EDW	132	1	3	1.3	0.0	114	0	4	0	7.1	1.2
EEZ	48	0	2	1.1	0.4	36	0	8	0	7.9	1.0
EIA	304	0	15	1.5	0.2	300	0	100	0	14.1	2.4
ELY	203	0	3	1.5	0.0	202	0	4	0	6.2	0.0
ETH	55	2	9	1.4	0.0	57	2	18	0	10.0	0.0
EVA	96	2	8	1.4	0.3	100	0	10	0	10.4	0.2
EWV	113	0	4	1.4	0.2	109	1	5	0	7.0	1.3
FDX	2133	0	43	1.4	0.5	2117	0	44	0	7.6	0.4
FGS	96	0	1	1.4	0.3	96	0	0	0	4.6	1.1
FGZ	39	0	0	1.1	0.0	39	0	0	0	4.3	0.2
FIN	380	0	5	1.8	0.2	335	0	7	0	8.8	0.2
FJI	989	1	48	1.2	0.5	971	0	83	0	7.3	0.6

IDENT.	N.REP.	TEMPERATURE				BIAS	N.REP.	WIND				BIAS
		PG	PR	RMS	PG			PR	PC	RMS		
FOM	453	0	25	1.5	-0.2		454	1	27	0	6.1	0.6
GAF	41	0	5	1.5	-0.8		38	0	3	0	5.5	0.2
GCO	370	1	17	1.6	0.6		372	0	100	0	10.5	1.8
GHA	108	1	5	1.4	0.1		80	0	5	0	9.1	3.0
GOJ	22	0	0	1.2	-0.2		22	0	0	0	3.6	-0.5
GRL	43	0	2	1.7	-0.1		32	0	0	0	3.7	0.6
GTI	234	0	16	1.9	-0.3		229	0	15	0	7.9	0.8
GWW	45	0	0	1.4	-0.2		44	0	0	0	4.5	-0.7
HAL	5699	0	40	1.2	-0.1		5649	0	41	0	7.0	0.6
IBE	3089	0	5	1.4	0.5		1950	0	7	0	6.5	0.6
ICE	963	1	4	1.7	-0.3		883	1	4	0	7.6	0.7
IWD	345	0	1	1.3	0.1		229	0	1	0	5.3	1.0
JAA	140	2	5	2.5	1.8		134	0	3	0	8.8	1.4
JAL	2931	0	4	1.6	0.5		2845	0	5	0	7.1	0.2
JAZ	1081	0	6	1.7	1.2		1049	0	6	0	6.9	0.3
JBU	66	3	5	1.7	1.1		65	0	2	0	6.7	0.3
JMC	115	1	5	1.6	0.6		93	0	2	0	5.2	0.9
KAI	29	0	52	3.5	0.6		29	0	45	0	5.3	2.7
KAL	3590	1	8	1.6	0.0		3554	0	9	0	7.3	0.3
KLM	2108	0	3	1.5	0.3		1597	0	3	0	6.0	0.8
LAN	391	1	6	1.7	-0.2		385	0	65	0	5.5	1.0
LAP	44	0	14	2.1	0.4		38	0	13	0	7.7	0.9
LDA	65	0	9	1.2	-0.3		55	0	13	0	7.4	1.3
LDI	607	0	5	1.3	-0.6		422	0	5	0	5.9	-0.3
LIB	1016	1	4	1.5	1.0		706	0	5	0	6.3	1.2
LOT	85	0	4	2.0	-0.8		77	0	4	0	8.1	0.7
LTU	790	0	5	1.3	0.2		631	0	6	0	6.4	1.2
LXJ	20	5	55	1.0	-0.6		22	0	45	0	5.2	1.2
LXR	164	2	7	1.8	0.4		112	1	8	0	6.4	0.7
MAS	360	0	6	1.4	0.2		361	0	8	0	9.2	1.0
MON	86	1	1	1.4	0.7		63	0	3	0	6.5	-0.3
MPD	565	1	5	1.5	-0.1		426	0	4	0	5.8	0.5
MPH	694	0	3	1.7	-0.7		610	0	3	0	7.3	-0.1
MYT	331	1	2	1.3	0.0		287	0	2	0	6.1	0.7
NCA	764	0	4	2.1	0.5		604	0	5	0	7.0	0.2
NGA	49	0	0	0.9	-0.1		43	0	0	0	5.0	-0.5
NWA	9987	0	9	1.6	0.5		9749	0	9	0	7.3	0.4
NZL	4211	0	12	1.5	-0.1		4211	0	12	0	5.5	0.6
OAE	203	0	42	1.0	-0.2		202	0	45	0	8.5	0.4
PAC	628	0	20	1.9	0.4		659	0	21	0	7.7	0.3
PAL	1481	1	9	1.4	0.1		1361	0	10	0	7.5	0.7
PAO	322	1	53	1.5	0.2		320	0	53	0	7.4	0.7
PUA	24	0	17	3.7	0.1		23	4	9	0	11.9	2.0
QFA	2727	0	49	1.3	0.4		2719	0	50	0	6.0	0.3
RAF	53	0	0	1.9	1.0		50	0	0	0	5.5	0.9
RAM	344	1	5	1.6	0.2		168	0	5	0	8.1	0.3
RCH	375	3	100	2.9	-0.4		338	0	100	0	12.5	2.5
RJA	37	5	24	2.7	0.2		37	0	22	0	13.0	2.2
RRR	208	1	10	2.0	0.3		180	1	10	0	9.1	-0.3
RYN	549	0	43	1.2	0.2		538	0	44	0	6.3	0.2
RZO	717	1	4	2.4	1.0		357	0	5	0	7.8	0.6
SAA	337	1	2	1.3	-0.1		269	0	1	0	6.1	1.0
SIA	256	0	3	1.2	0.1		265	0	2	0	4.7	0.3
SLR	262	2	10	1.2	0.3		225	0	11	0	7.4	-0.2
SOO	26	0	31	4.1	2.4		39	0	3	0	6.2	0.1
SQC	61	0	3	1.4	0.1		61	0	3	0	5.3	0.2
SSV	72	1	7	1.2	-0.4		71	0	7	0	6.4	0.2
SVA	49	6	10	1.7	-0.5		52	0	4	0	5.3	0.7
TAM	43	5	23	2.3	0.6		40	0	23	0	12.5	0.2

IDENT.	N.REP.	TEMPERATURE				N.REP.	WIND				BIAS
		PG	PR	RMS	BIAS		PG	PR	PC	RMS	
TAP	895	1	4	1.5	-0.2	323	0	7	0	7.4	0.7
TCV	29	0	14	2.5	0.8	21	0	10	0	9.1	0.5
THA	118	0	3	1.3	-0.2	119	0	4	0	5.8	0.4
THT	162	2	25	1.6	0.2	146	0	25	0	7.4	0.8
TPA	53	0	0	1.1	0.5	50	0	0	0	5.3	-0.2
TSC	259	0	1	1.4	0.0	211	0	3	0	7.6	1.0
UAL	274883	0	97	1.0	-0.1	274606	0	97	0	4.7	0.4
UPS	2180	0	51	1.7	0.5	2130	0	50	0	7.3	0.4
USA	152	1	1	1.2	0.0	130	0	3	0	8.1	0.7
VIR	318	0	2	1.6	-0.1	294	0	4	0	8.4	1.3
VRG	171	0	18	2.1	0.5	166	1	100	0	11.3	1.2
VVJ	20	0	30	1.8	0.9	20	0	30	0	4.9	0.5
VVR	59	0	29	3.0	-0.3	55	0	27	0	7.5	2.2
WOA	255	0	6	1.4	0.5	242	0	9	0	8.6	0.4
YSS	253	2	40	1.9	0.7	174	0	3	0	5.6	1.0
9VS	74	0	0	1.2	0.2	72	0	0	0	4.2	0.1
AR	1525	0	100	3.4	3.1	1517	0	5	0	7.0	1.0
AU	35843	0	13	1.2	0.6	35850	0	12	0	5.1	0.6
EU	145910	0	25	1.3	0.2	145909	0	25	0	4.8	0.5
KL	2561	0	7	1.4	0.8	2551	0	8	0	6.6	0.2
LH	3003	0	10	1.7	1.2	2985	0	10	0	5.1	0.7
MK	4616	0	13	1.7	1.3	4594	0	7	0	7.3	1.2
SA	4682	0	45	1.9	1.1	4671	0	6	0	7.7	0.7
TN	42	0	21	3.2	2.4	44	0	16	0	9.3	1.3
N	1556	1	17	1.6	0.3	1554	0	16	0	6.0	0.8
US ACARS	1083518	1	62	1.2	0.5	1083512	0	61	0	5.2	0.7

TABLE 4B

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: August 2002

Monitoring procedures

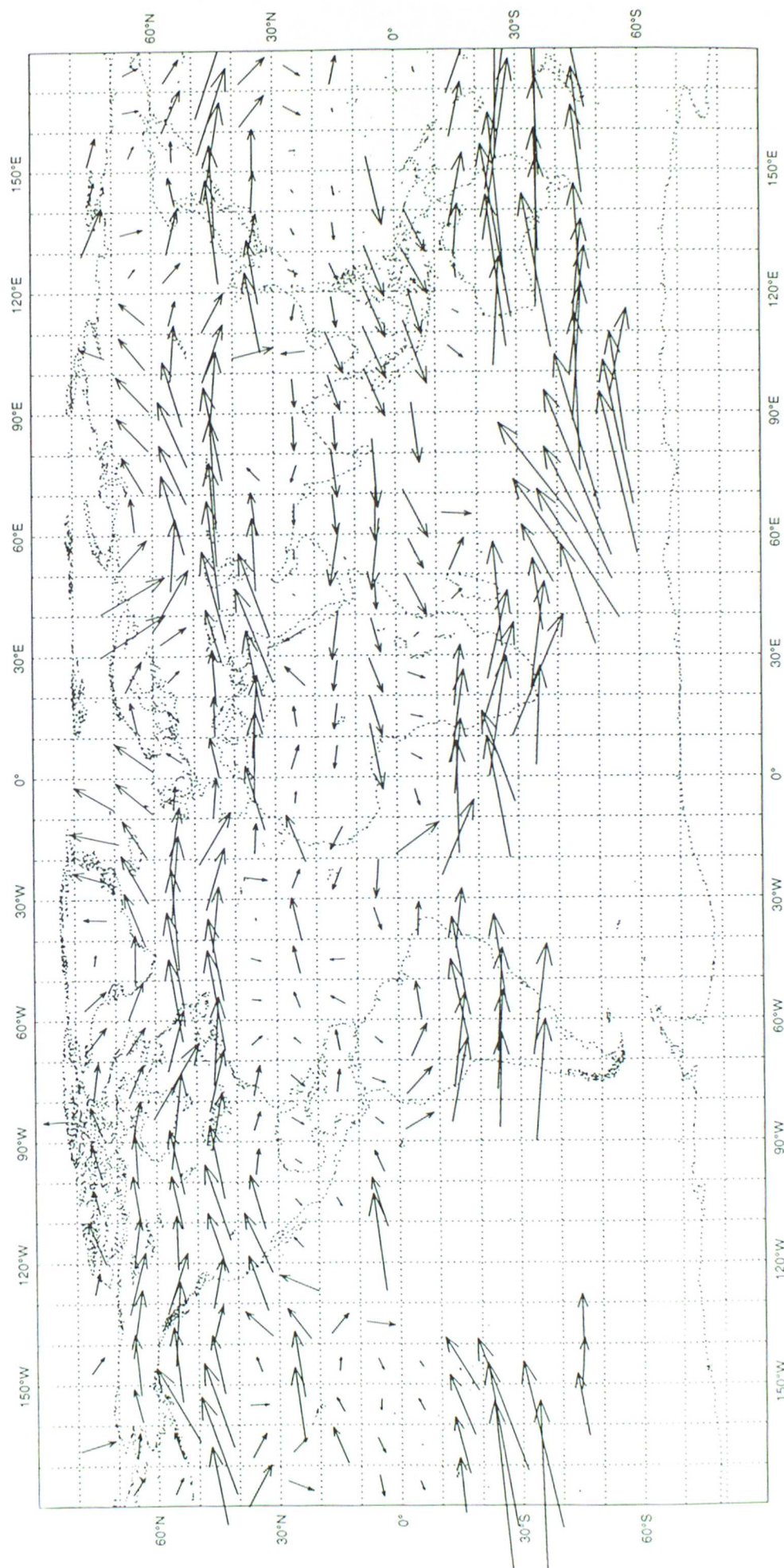
Period	:One calendar month.
Data monitored	:Statistics for each airline carrier.
Area monitored	:90°N - 90°S, 180°W - 180°E.
Standard of comparison	:Background field from UKMO global model.
Observation times	:All hours combined.
Level(s) monitored	:1000.0 – 300.1 hPa
Elements monitored	:TEMP in °C ; WIND in m s ⁻¹
Parameters monitored	
:N REP.	:Number of observations received excluding duplicates.
:PG	:Percentage of observations with gross errors.
:PR	:Percentage of observations rejected by quality control including rejections from the duplicate check.
:PC	:Percentage of observations with calm winds.
:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.
:BIAS	:Mean difference of observations from background values excluding those with gross errors in Temperature & Wind Speed.
GROSS ERROR LIMITS	:10.0 °C ; 60 m s ⁻¹ Vector Wind
SELECTION CRITERIA	:N REP ≥ 20

NB : All American ACARS data are grouped together and statistics are shown at the bottom of the table as "US ACARS". All ADS reports are similarly grouped together.

IDENT.	N.REP.	TEMPERATURE				N.REP.	WIND				BIAS
		PG	PR	RMS	BIAS		PG	PR	PC	RMS	
AAL	196	1	35	1.1	0.1	194	0	36	0	5.3	0.6
AAR	31	3	13	1.0	-0.2	33	0	9	0	6.8	1.6
ACA	35	0	17	1.7	-0.5	34	0	18	0	5.2	0.0
ACI	20	0	55	1.3	0.8	20	0	55	0	7.3	0.9
AEL	40	5	18	2.1	-0.5	29	0	14	0	10.2	1.3
AFR	105	0	4	0.9	0.3	96	0	3	0	5.7	0.8
AME	22	27	36	3.9	1.6	22	0	0	0	4.7	-0.6
ANZ	203	0	33	1.5	0.0	203	0	32	0	8.7	0.7
AXF	49	2	59	1.0	0.4	49	0	63	0	14.2	1.7
AZA	23	0	9	1.2	0.0	21	0	10	0	5.2	-0.8
BAF	23	0	9	2.2	-0.2	23	0	9	0	10.6	0.7
CES	24	0	33	2.8	0.0	26	0	35	0	11.4	-1.2
CFC	101	3	9	1.2	0.5	89	0	9	0	7.5	0.0
CFG	47	0	6	0.9	-0.2	34	0	3	0	5.8	0.9
CMI	29	0	14	1.0	-0.3	30	0	13	0	5.4	0.1
COA	105	0	54	1.0	-0.2	103	0	54	0	6.7	-0.6
CRL	31	0	13	1.1	0.2	27	0	22	0	8.2	3.2
CUB	74	1	4	1.4	0.6	50	0	10	0	10.8	0.4
DAL	268	1	46	1.5	-0.1	253	0	46	0	5.4	0.9
DLH	184	0	17	1.7	0.1	177	1	17	0	7.0	0.8
EWV	93	0	6	1.8	0.3	87	0	7	0	9.2	0.3
FDX	478	1	37	1.4	0.5	463	0	38	0	7.5	0.4
FIN	33	0	3	1.9	0.0	30	0	10	0	11.5	-0.2
FOM	23	0	52	1.5	-0.4	23	0	52	0	4.6	0.3
FXI	50	2	6	2.6	1.8	40	0	10	0	10.4	2.5
GAF	93	3	5	1.5	0.3	85	0	5	0	6.9	0.1
GCO	258	1	12	1.5	0.1	259	0	100	0	16.2	4.0
GHA	24	0	4	1.7	-0.3	20	0	15	0	13.2	2.2
HAL	64	0	41	1.6	-0.1	63	0	40	0	6.4	1.6
IBE	42	0	14	0.9	0.2	36	0	17	0	7.4	1.7
ICE	47	2	2	1.7	-0.6	42	2	2	0	5.6	1.4
JAL	45	2	4	1.4	0.5	45	0	2	0	8.8	1.2
JAZ	71	1	4	1.3	1.0	68	0	3	0	5.3	0.1
KAL	54	2	19	1.7	-0.3	51	0	16	0	8.1	-0.8
KIW	42	2	43	2.3	0.0	42	0	43	0	10.7	-3.3
KLM	57	0	0	1.1	0.4	49	0	0	0	6.4	1.2
LAN	25	0	4	1.2	0.5	21	0	71	0	5.9	0.2
LIB	77	1	10	1.6	0.8	58	0	12	0	8.0	0.0
MAS	41	5	32	1.0	0.0	41	0	32	0	13.1	0.6
MPH	40	5	8	1.1	-0.3	38	0	8	0	8.4	0.2
MYT	27	4	7	2.3	-0.1	27	0	7	0	11.4	2.5
NCA	81	0	1	1.7	-0.1	68	0	0	0	5.4	-0.9
NWA	374	2	11	1.4	0.3	351	0	11	0	8.5	-0.2
NZL	19983	0	59	1.3	0.4	19983	0	59	0	5.4	0.1
QFA	219	0	51	1.5	0.0	219	0	51	0	5.5	0.2
RCH	99	2	100	3.9	-2.1	75	0	100	0	12.4	3.7
RRR	153	6	22	3.4	1.7	144	0	17	0	10.3	0.8
RTA	36	0	33	3.1	1.6	37	0	30	0	5.1	1.3
SAA	61	3	10	1.8	-1.1	58	0	5	0	4.7	-0.2
SIA	43	0	2	1.1	0.4	45	0	2	0	5.2	1.1
UAL	591565	0	99	1.2	-0.1	590702	0	99	0	3.9	0.4
UPS	87	0	47	0.9	0.2	86	1	48	0	5.2	0.6
VVR	24	0	33	1.4	-1.0	24	0	46	0	9.3	2.7
WOA	48	0	6	1.8	0.3	48	0	6	0	6.7	0.4
AR	1080	0	100	2.4	1.7	1068	0	50	0	5.1	0.5

IDENT.	N.REP.	TEMPERATURE				N.REP.	WIND				BIAS
		PG	PR	RMS	BIAS		PG	PR	PC	RMS	
AU	20425	0	48	1.1	0.4	20435	0	48	0	4.2	0.1
EU	529315	0	67	1.0	0.1	527233	0	67	0	3.7	0.2
KL	1601	0	59	1.5	0.3	1597	0	59	0	4.3	0.2
LH	1253	0	59	1.1	0.6	1244	0	59	0	3.8	0.8
MK	3135	0	55	1.4	0.6	3109	0	54	0	5.1	0.6
SA	3506	0	72	1.5	0.6	3506	0	56	0	5.1	0.3
N	31	19	71	5.9	4.7	29	0	28	0	6.3	0.3
US ACARS	2049165	0	78	1.2	0.2	2043772	0	78	0	3.9	0.4

Figure 4a. AIRCRAFT 300 - 150 hPa mean winds. AUGUST 2002
 Observations with O-B vector difference greater than 60 ms-1 excluded
 Arrows are plotted where greater than 30 obs are present



15.0 m/s
 — X —>

Figure 4b. AIRCRAFT 1000 - 301 hPa mean winds. AUGUST 2002
 Observations with O-B vector difference greater than 60 ms-1 excluded
 Arrows are plotted where greater than 30 obs are present

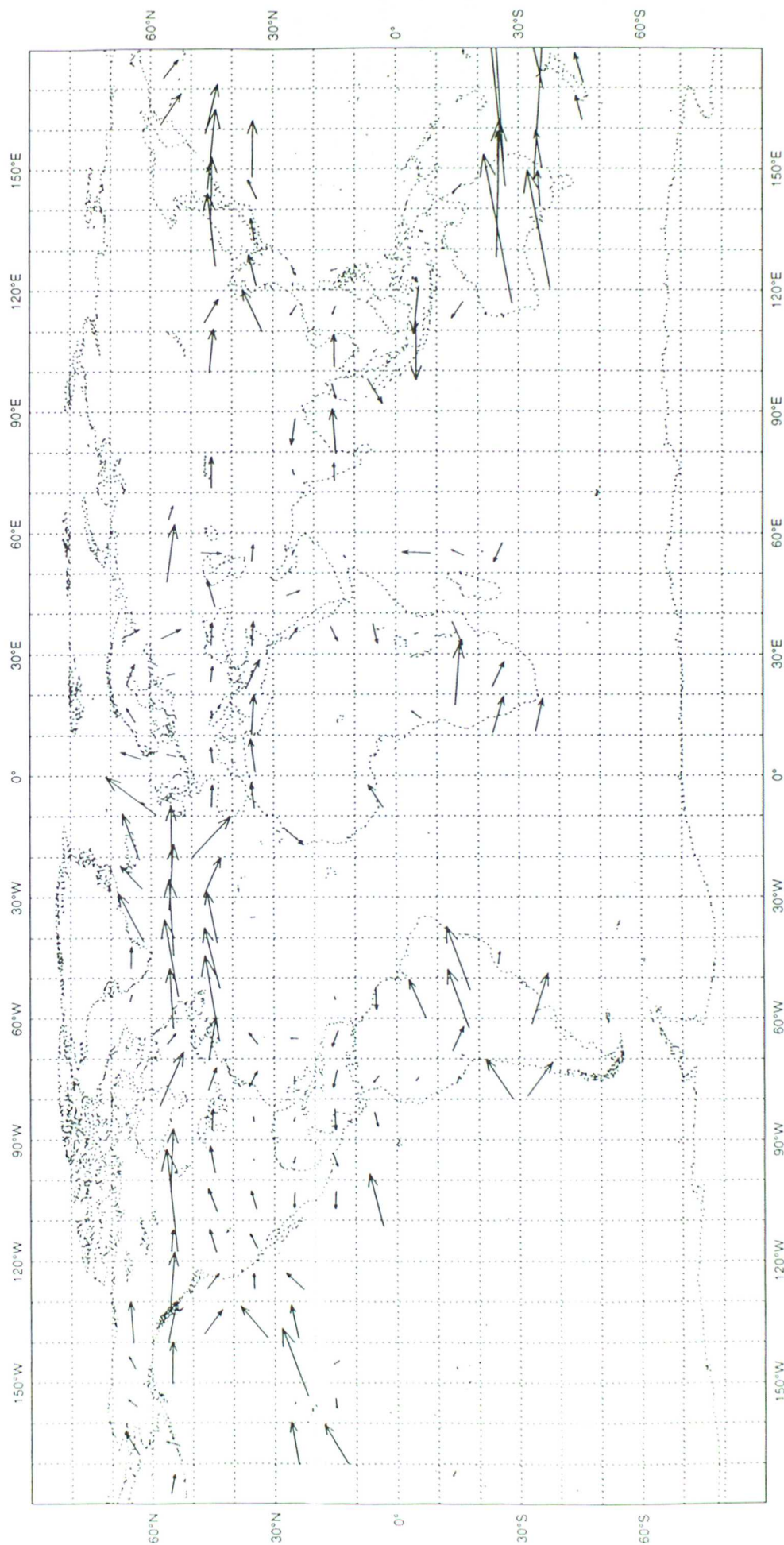
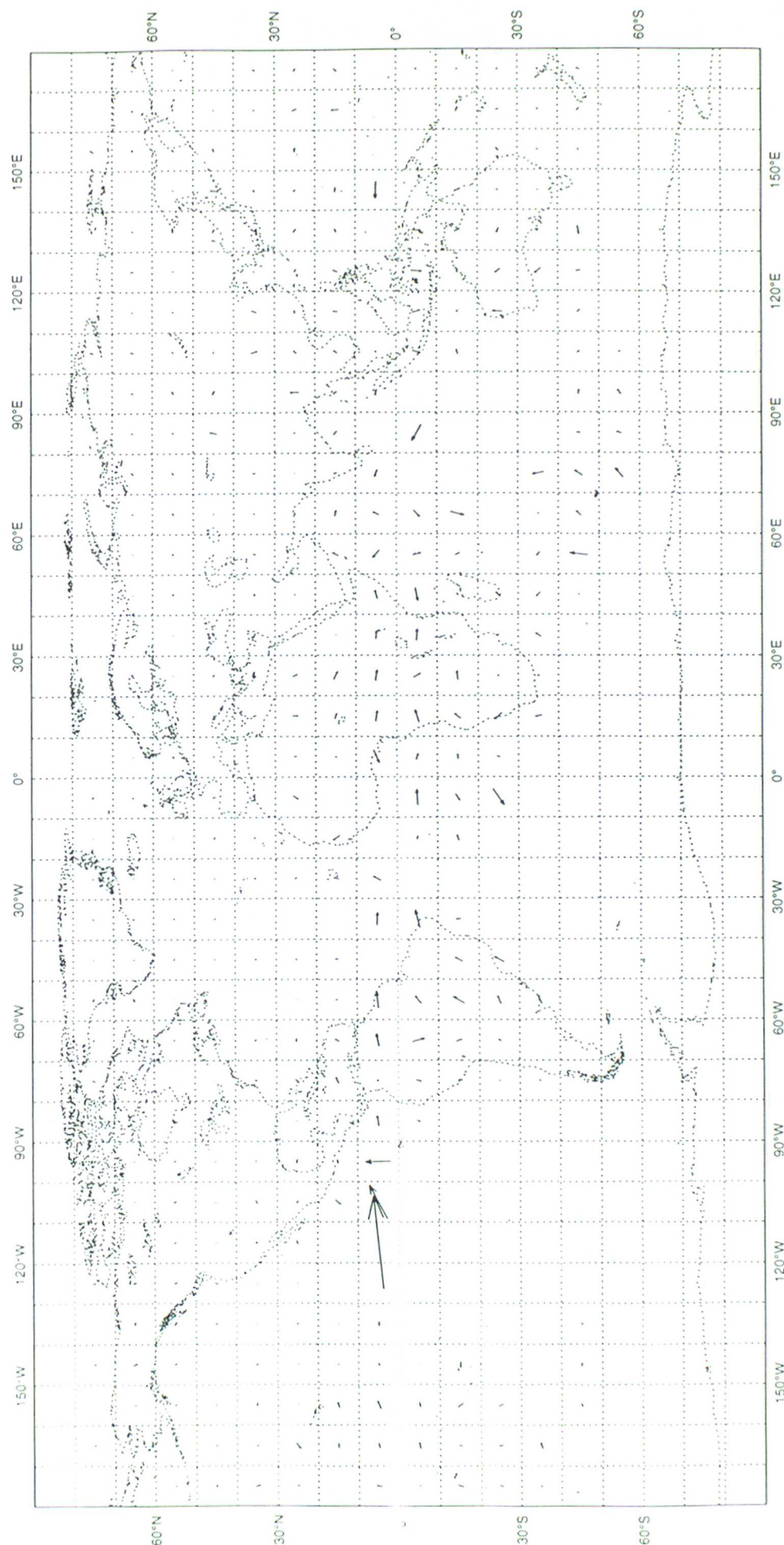
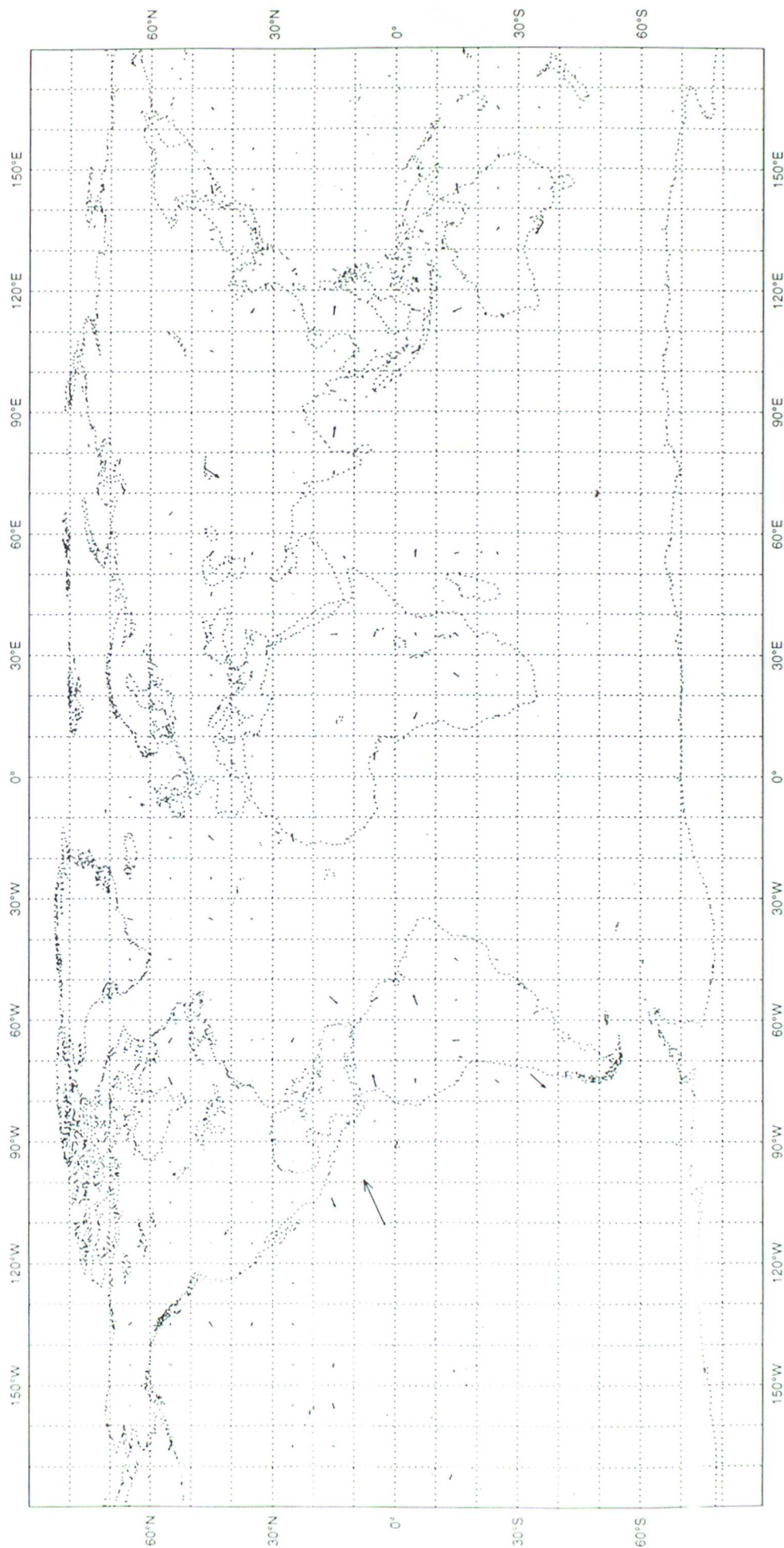


Figure 5a. AIRCRAFT 300 - 150 hPa mean O-B winds. AUGUST 2002
 Observations with O-B vector difference greater than 60 ms-1 excluded
 Arrows are plotted where greater than 30 obs are present



15.0 m/s

Figure 5b. AIRCRAFT 1000 - 301 hPa mean O-B winds. AUGUST 2002
 Observations with O-B vector difference greater than 60 ms-1 excluded
 Arrows are plotted where greater than 30 obs are present



15.0 m/s

Figure 6b. AIRCRAFT 1000 - 301 hPa mean O-B speeds (ms-1). AUGUST 2002
 Observations with O-B vector difference greater than 60 ms-1 excluded
 Values are printed where greater than 30 obs are present

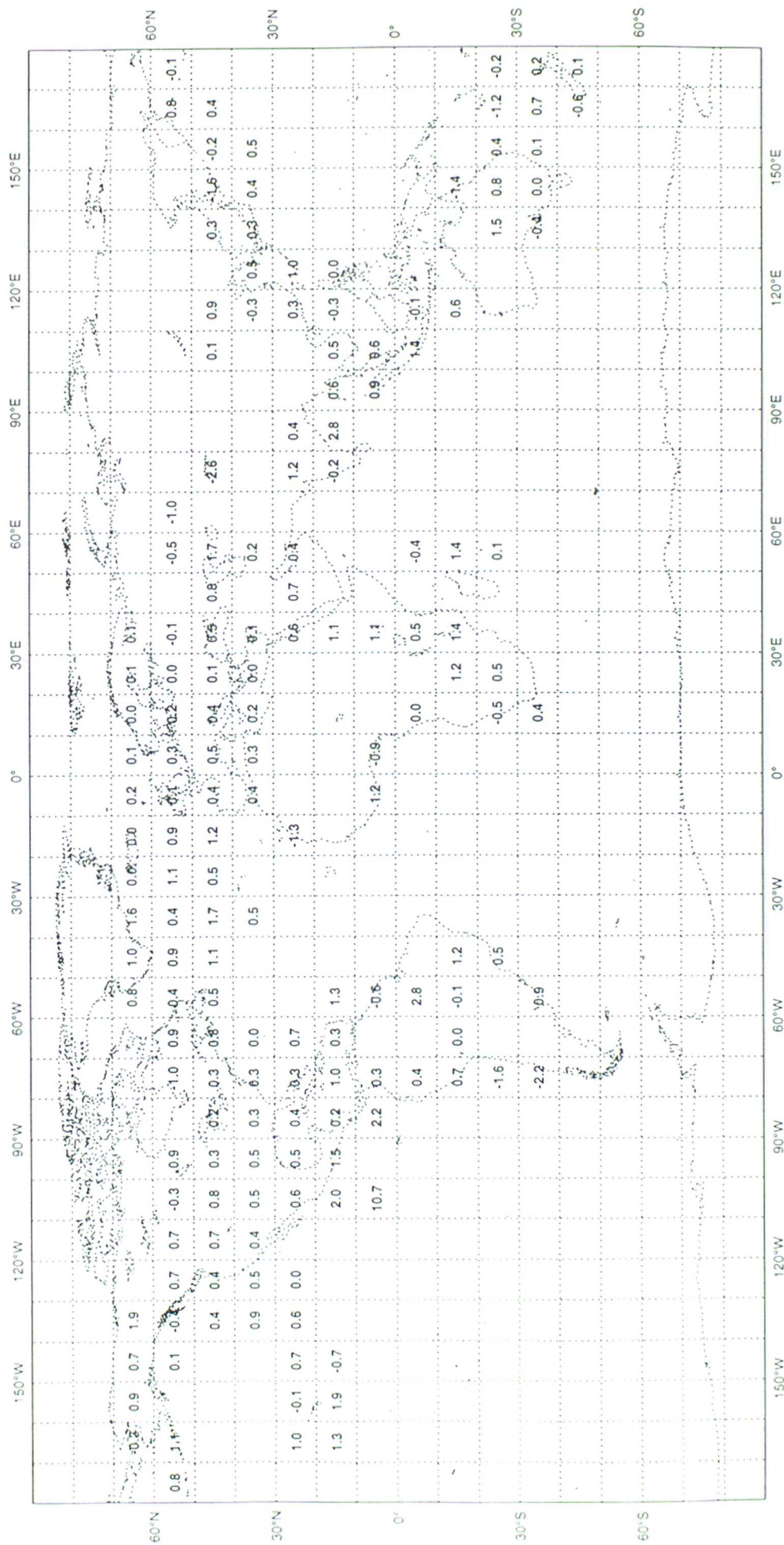


Figure 7a. AIRCRAFT 300 - 150 hPa RMS O-B vector (ms-1). AUGUST 2002
 Observations with O-B vector difference greater than 60 ms-1 excluded
 Values are printed where greater than 30 obs are present

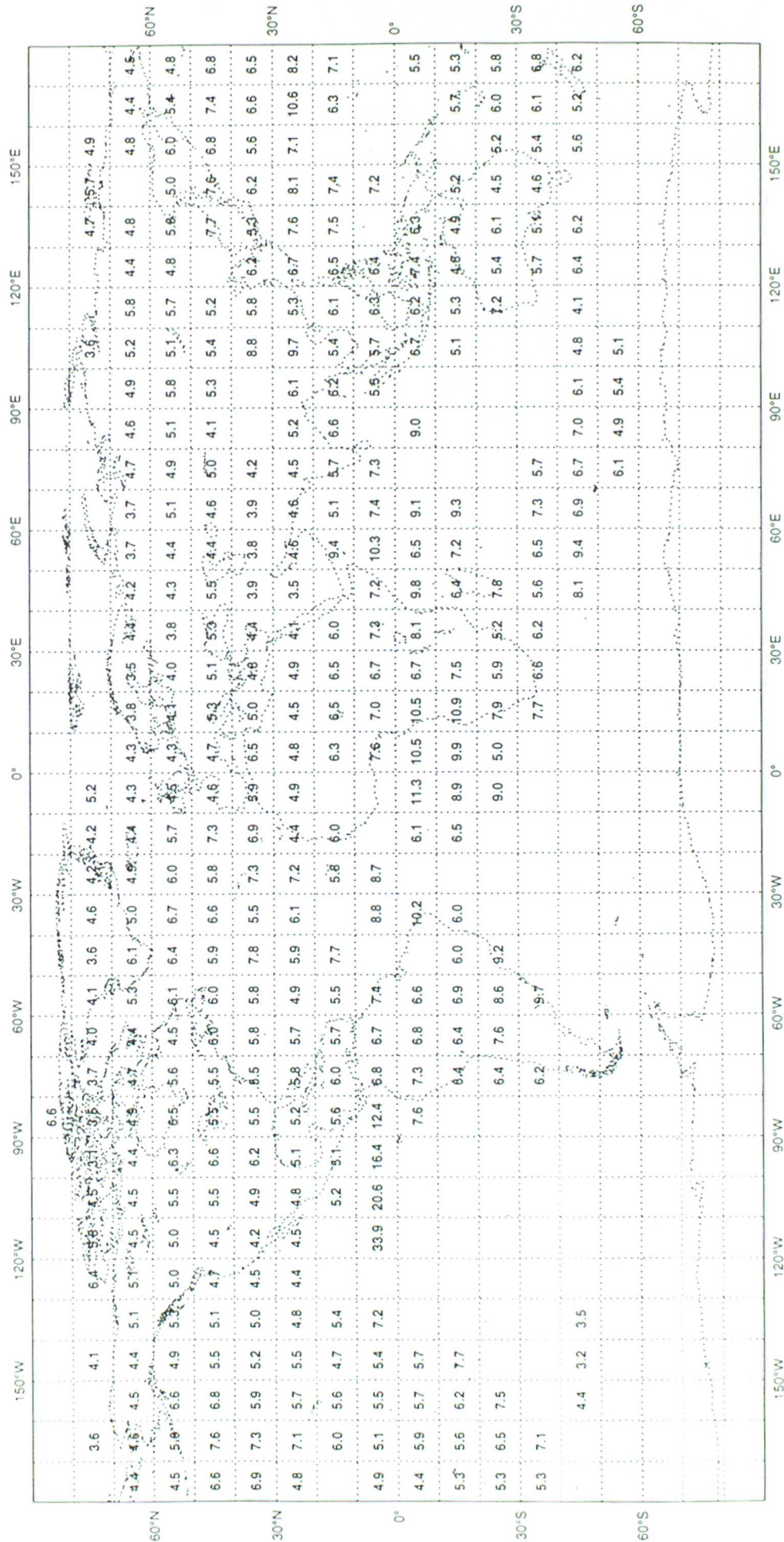


Figure 7b. AIRCRAFT 1000 - 301 hPa RMS O-B vector (ms-1). AUGUST 2002
 Observations with O-B vector difference greater than 60 ms-1 excluded
 Values are printed where greater than 30 obs are present

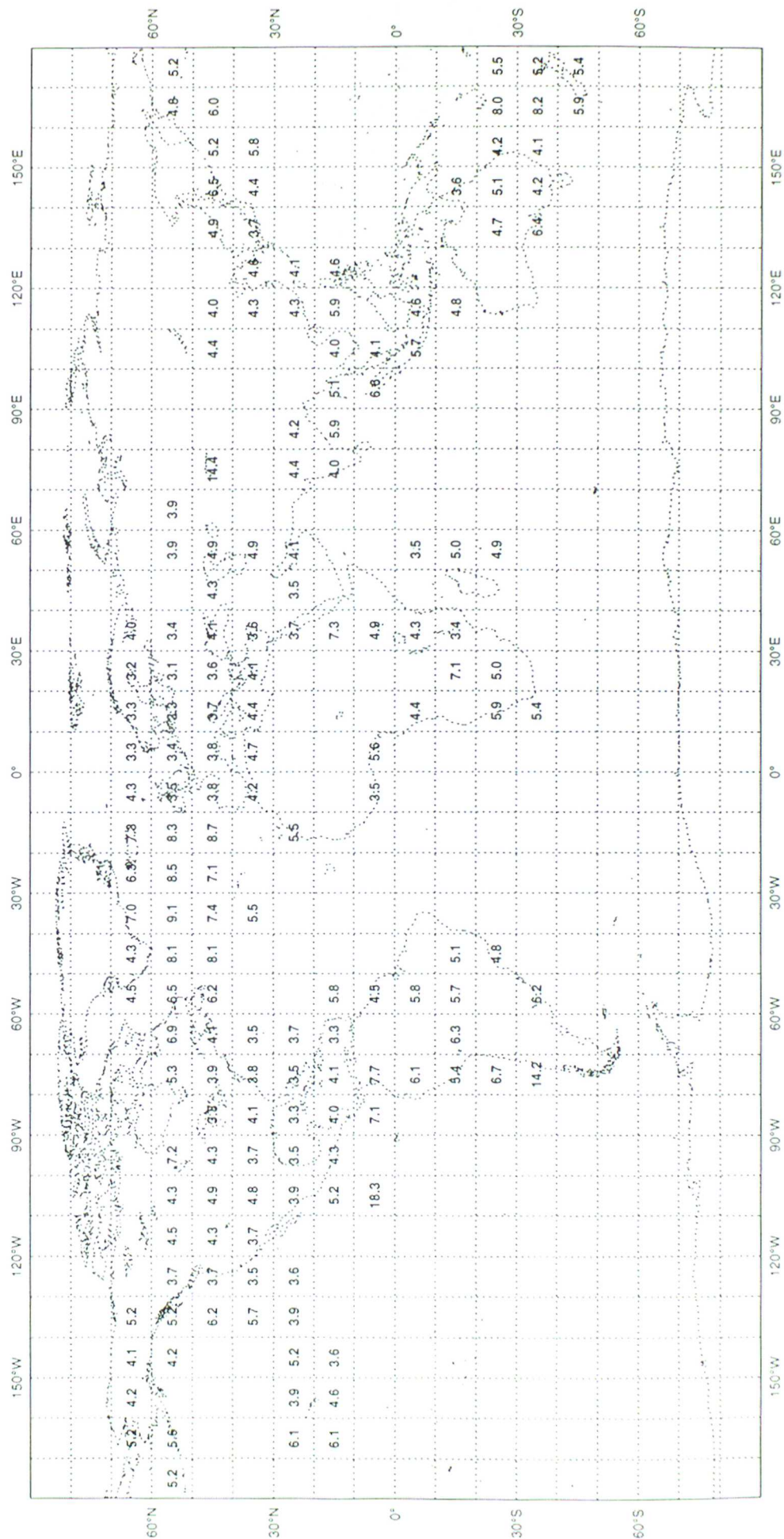


TABLE 5

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: August 2002

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from each unique identifier for radiosonde TEMPs.
Area monitored		:90°N - 90°S, 180°W - 180°E.
Standard of comparison		:Background field from UKMO global model.
Observation times		:00 UTC and 12 UTC.
Level(s) monitored		:Standard levels between 1000.0 - 30.0 hPa
Element monitored		:GEOPOTENTIAL HEIGHT IN metres
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:% REJ	:Percentage of observations rejected by quality control at level shown during period excluding those with gross errors.
	:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.
	:NUM LEVELS	:Number of levels satisfying selection criteria.
GROSS ERROR LIMITS	:Defined in Appendix I.1	
SELECTION CRITERIA	: ≥ 3 levels with ≥ 10 observations and ≥ 100 m weighted RMS.	

ONLY THE WORST LEVEL IS SHOWN WITH UNWEIGHTED RMS

WMO IDENT	OBS TIME	ELM	LEV	LAT/LONG		NUM OBS	NUM GROSS	SD	BIAS	RMS	NUM LEVELS
26477	12	Z	70	56/	31	22	0	70.1	174.5	188.1	9
28722	00	Z	1000	55/	56	25	4	32.9	-39.2	51.2	4
32098	00	Z	100	49/	143	21	0	29.3	132.6	135.8	4
33837	00	Z	70	46/	31	17	0	92.2	200.0	220.2	6
34247	12	Z	1000	50/	41	27	1	31.8	-34.6	47.0	5
34858	12	Z	1000	46/	43	19	6	36.0	-25.5	44.1	4
40373	12	Z	30	28/	46	11	0	60.4	225.7	233.7	4
40417	12	Z	1000	26/	50	24	0	44.5	-25.5	51.3	4
42027	12	Z	150	34/	75	11	1	77.1	108.5	133.1	4
42101	00	Z	250	30/	76	23	0	48.4	-55.9	73.9	5
42101	12	Z	30	30/	76	16	0	115.0	283.3	305.8	6
42314	00	Z	70	27/	95	16	1	84.9	108.7	137.9	5
42339	12	Z	150	26/	73	17	0	80.9	93.6	123.8	6
42369	00	Z	1000	27/	81	13	14	41.2	-50.5	65.1	9
42369	12	Z	70	27/	81	8	5	217.7	210.9	303.1	10
42379	00	Z	70	27/	83	11	0	52.9	165.1	173.4	6
42379	12	Z	30	27/	83	10	1	113.7	241.8	267.2	6
42397	12	Z	70	27/	88	12	0	96.3	190.3	213.3	5
42410	00	Z	70	26/	92	19	0	104.9	110.6	152.4	4
42410	12	Z	70	26/	92	13	0	141.5	86.8	166.0	7
42492	00	Z	1000	26/	85	18	8	36.3	-38.4	52.8	5
42647	12	Z	1000	23/	73	26	0	35.4	-40.6	53.8	5
42724	00	Z	70	24/	91	22	0	75.6	130.7	151.0	5
42809	00	Z	30	23/	88	15	0	82.3	212.1	227.5	8
42809	12	Z	1000	23/	88	28	0	26.4	-30.1	40.1	5
42971	00	Z	1000	20/	86	28	1	35.3	-46.2	58.2	4
43003	00	Z	1000	19/	73	13	16	38.4	-49.2	62.4	4
43003	12	Z	1000	19/	73	13	17	37.9	-52.5	64.8	7
43014	00	Z	150	20/	75	9	1	102.5	89.7	136.1	7
43014	12	Z	400	20/	75	15	0	44.8	81.6	93.1	7
43128	00	Z	100	17/	78	17	0	136.9	-34.1	141.1	4
43185	00	Z	100	16/	81	22	0	126.0	-43.8	133.4	5
43185	12	Z	50	16/	81	13	0	109.7	156.8	191.4	5
43279	00	Z	50	13/	80	13	0	103.9	144.3	177.8	5
43279	12	Z	50	13/	80	15	1	87.7	187.4	206.9	5
43311	00	Z	200	11/	73	22	0	73.4	-77.6	106.8	6
43333	00	Z	50	12/	93	11	0	121.7	166.6	206.3	5
43346	00	Z	150	11/	80	26	1	66.5	-107.4	126.4	4
43346	12	Z	30	11/	80	15	3	121.1	219.1	250.4	6
43369	00	Z	150	8/	73	11	1	104.0	-101.2	145.1	4
43369	12	Z	400	8/	73	29	0	47.7	37.3	60.6	5
43371	12	Z	50	8/	77	19	0	145.5	149.2	208.3	5
44292	00	Z	1000	48/	107	5	23	9.8	47.2	48.2	5
58968	00	Z	1000	25/	122	12	15	44.6	-51.2	67.9	4
84628	12	Z	850	-12/	-77	25	0	5.8	-77.4	77.6	4
97180	00	Z	200	-5/	120	11	0	91.5	-53.6	106.1	10

Figure 8. TEMP 500 hPa geopotential mean daily count. AUGUST 2002
 All hours
 Global average number of observations in 24 hours = 1136

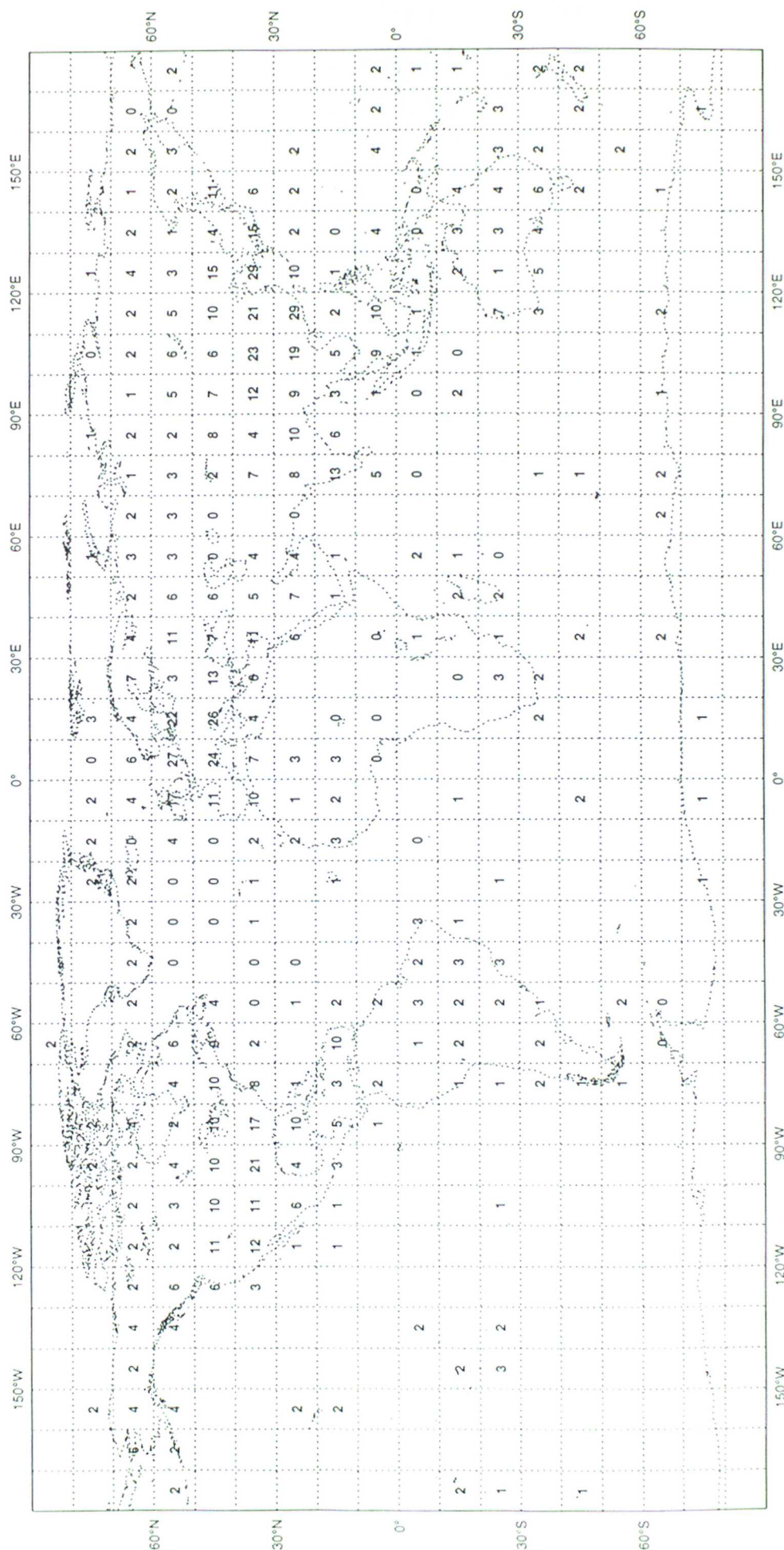


TABLE 6

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: August 2002

Monitoring procedures

Period	:One calendar month.	
Data monitored	:Reports from each unique identifier for radiosonde TEMPs.	
Area monitored	:90°N - 90°S, 180°W - 180°E.	
Standard of comparison	:Background field from UKMO global model.	
Observation times	:00 UTC and 12 UTC.	
Level(s) monitored	:Standard levels between 1000.0 - 100.0 hPa	
Element monitored	:VECTOR WIND in m s^{-1}	
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:% REJ	:Percentage of observations rejected by quality control at level shown during period excluding those with gross errors.
	:UBIAS,VBIAS	:Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.
	:NUM LEVELS	:Number of levels satisfying selection criteria.
GROSS ERROR LIMITS	:Defined in Appendix I.2	
SELECTION CRITERIA	: ≥ 10 observations and $\geq 15 \text{ m s}^{-1}$ RMS vector wind.	
	ONLY THE STANDARD LEVEL BETWEEN 1000 - 100 hPa WITH HIGHEST RMS IS SHOWN	

WMO IDENT	OBS TIME	ELM	LEV	LAT/LONG	NUM OBS	NUM GROSS	% REJ	UBIAS	VBIAS	RMS	LEVELS
PSPIU	00	V	100	-5/ -81	30	0	100	-4.2	8.6	24.7	3
PSPIU	12	V	150	-5/ -81	30	0	100	-2.0	6.8	22.1	2
17351	00	V	200	37/ 35	26	0	100	-13.0	-2.3	17.0	1
38341	00	V	250	43/ 71	13	0	100	-3.2	-17.7	20.1	4
41594	12	V	100	32/ 73	15	0	100	33.6	-4.9	37.5	5
43346	00	V	100	11/ 80	25	0	100	14.3	2.8	18.5	1
43346	12	V	100	11/ 80	23	0	100	12.5	-1.0	16.7	1
43369	00	V	150	8/ 73	11	0	100	3.4	-0.7	18.9	1
43371	00	V	100	8/ 77	20	0	70	11.4	1.5	15.3	1
48455	00	V	100	14/ 101	27	0	100	9.1	5.4	18.9	1
48455	12	V	100	14/ 101	22	0	100	11.4	4.1	16.0	1
60360	12	V	200	37/ 8	15	0	100	3.3	-2.5	16.3	1
60559	00	V	700	33/ 7	18	0	100	-8.9	3.6	15.2	1
68442	12	V	200	-29/ 26	12	0	100	-18.0	5.4	22.4	3
68512	12	V	200	-30/ 18	15	0	100	-12.3	1.7	18.7	3
98223	00	V	100	18/ 121	14	1	100	-10.4	-1.2	17.9	2

Figure 9. TEMP/PILOT 300 hPa wind mean daily count. AUGUST 2002
 All hours
 Global average number of observations in 24 hours = 1329

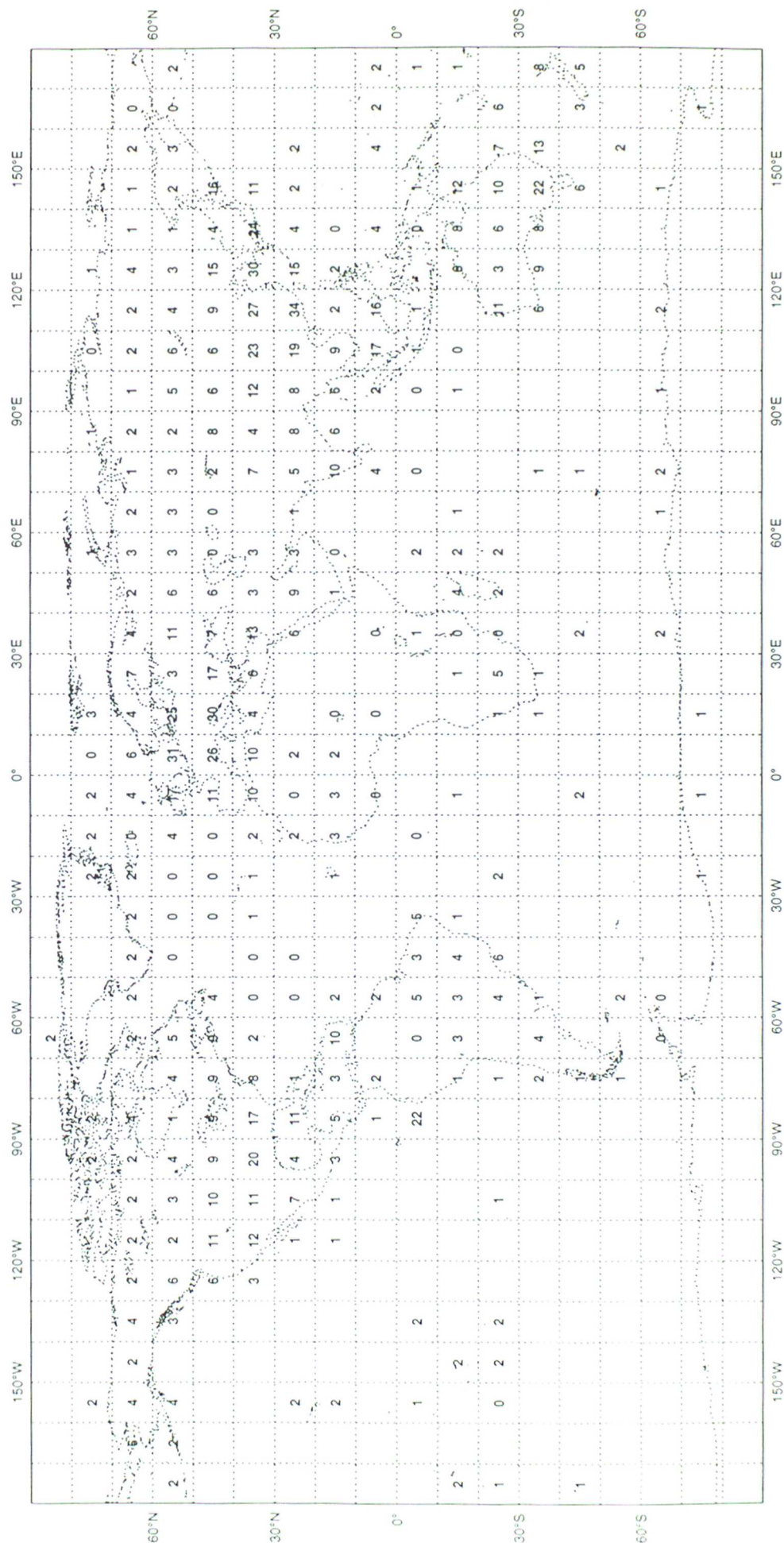


TABLE 7

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: August 2002

Monitoring procedures

Period	:One calendar month.
Data monitored	:Reports from each unique identifier for radiosonde TEMPs.
Area monitored	:90°N - 90°S, 180°W - 180°E.
Standard of comparison	:Background field from UKMO global model.
Observation times	:00 UTC and 12 UTC.
Level(s) monitored	:Standard levels between 500.0 - 150.0 hPa
Element monitored	:WIND DIRECTION in degrees
Parameters monitored	
	:NUM OBS :Average number of observations at all levels.
	:BIAS :Mean difference of observations from background values from all levels.
	:MAX SPREAD : (For observation - background values) Maximum absolute difference of SD at any level from SD at all levels
	:SD :SD of difference of observations from background values at all levels.
SELECTION CRITERIA	:NUM OBS ≥ 5 , and ABSOLUTE BIAS $\geq 10^\circ$, with SD $< 30^\circ$, and MAX SPREAD $< 10^\circ$

WMO IDENT	OBS TIME	ELM	LAT/LONG	NUM OBS	BIAS	MAX SPREAD	SD
10468	12	DD	52/ 12	21	10.2	5.9	15.4
29612	12	DD	55/ 78	27	19.8	4.0	8.2
40179	00	DD	32/ 35	29	-10.9	3.0	9.9
42339	00	DD	26/ 73	8	11.9	8.1	20.9
42397	00	DD	27/ 88	11	15.0	7.3	18.4
60490	12	DD	36/ -1	16	-10.2	3.1	13.6
62337	12	DD	31/ 34	22	-13.1	4.5	12.8
76644	12	DD	21/ -90	16	-11.5	6.6	21.1

MONITORING OF SATELLITE WINDS

MONITORING CENTRE: BRACKNELL

MONTH: August 2002

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from GOES-8, GOES-10, METEOSAT-5, METEOSAT-7, GMS-5, INSAT.

Standard of comparison :Background field from UKMO global model.

Selection Criteria :number of observations > 10.

Data Extracted :Layer 701 - 1000 hPa
401 - 700 hPa
101 - 400 hPa

:Mean wind

:Mean observation minus background vector wind differences

:Mean observation minus background speed differences

:RMS of observation minus background vector differences

Figure 10. SATOB 701 - 1000 hPa mean daily count. AUGUST 2002
Global average number of observations in 24 hours = 53494

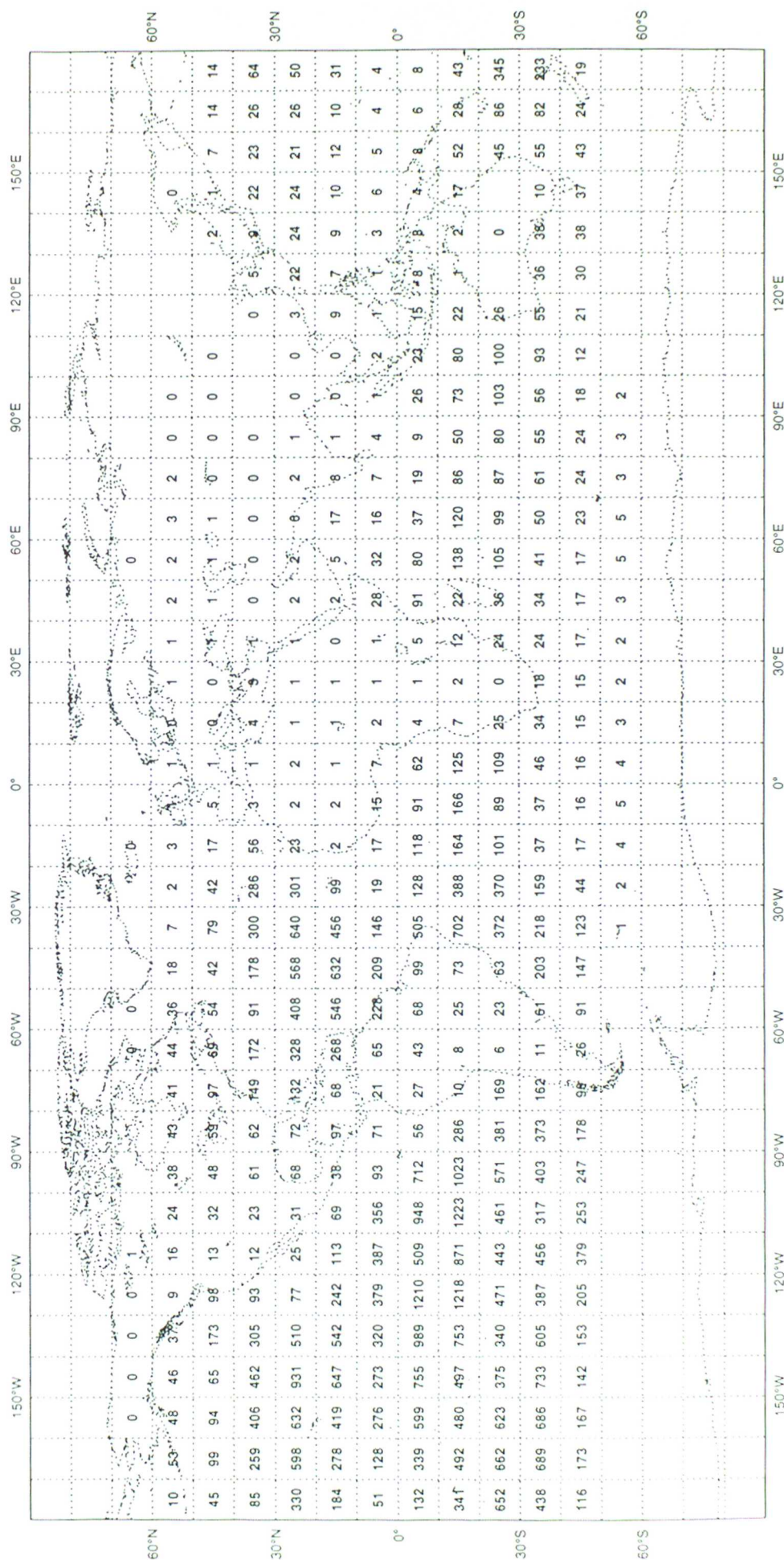


Figure 11. SATOB 701 - 1000 hPa vector mean wind. AUGUST 2002
 All observations
 Arrows are plotted where greater than 10 obs are present

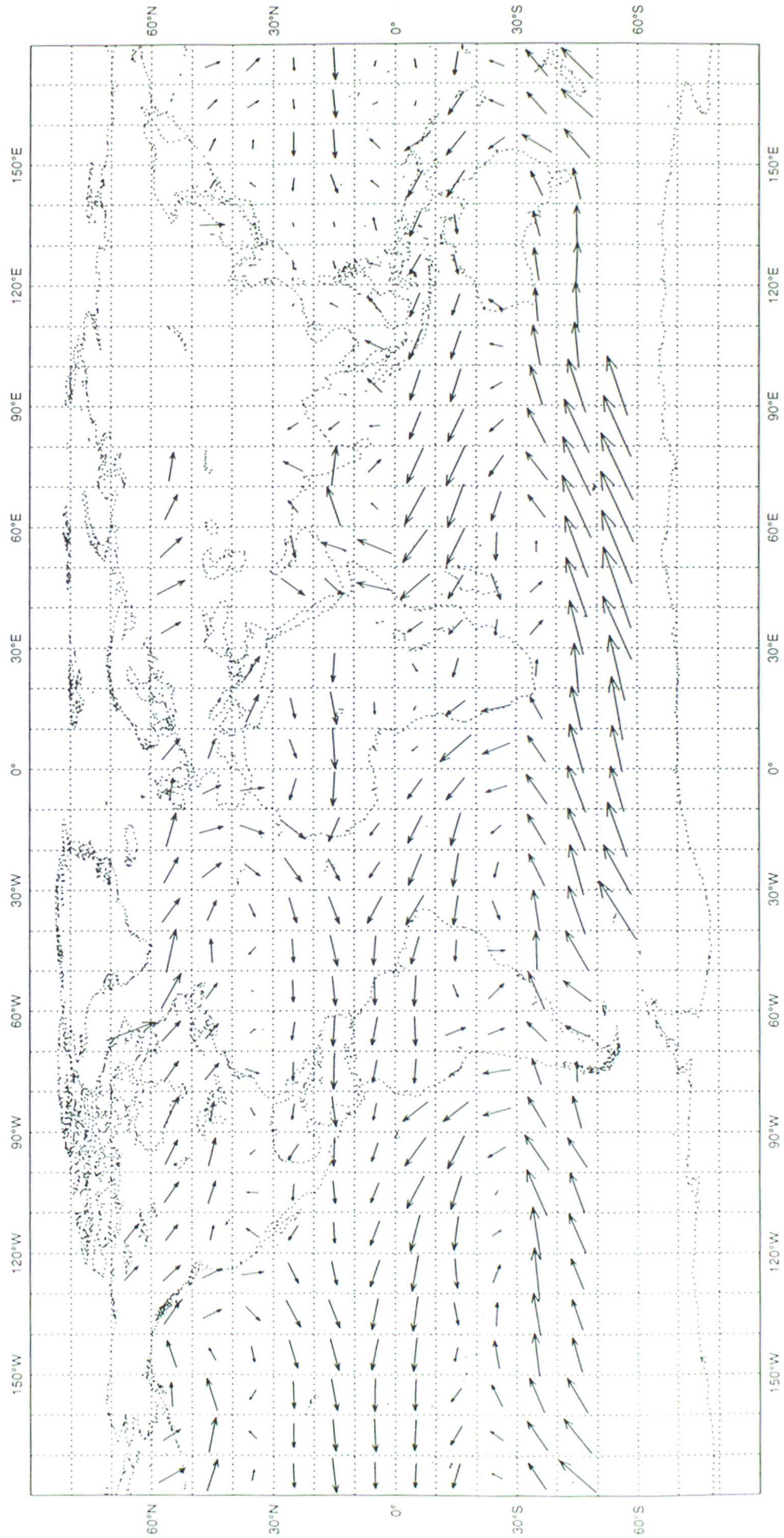
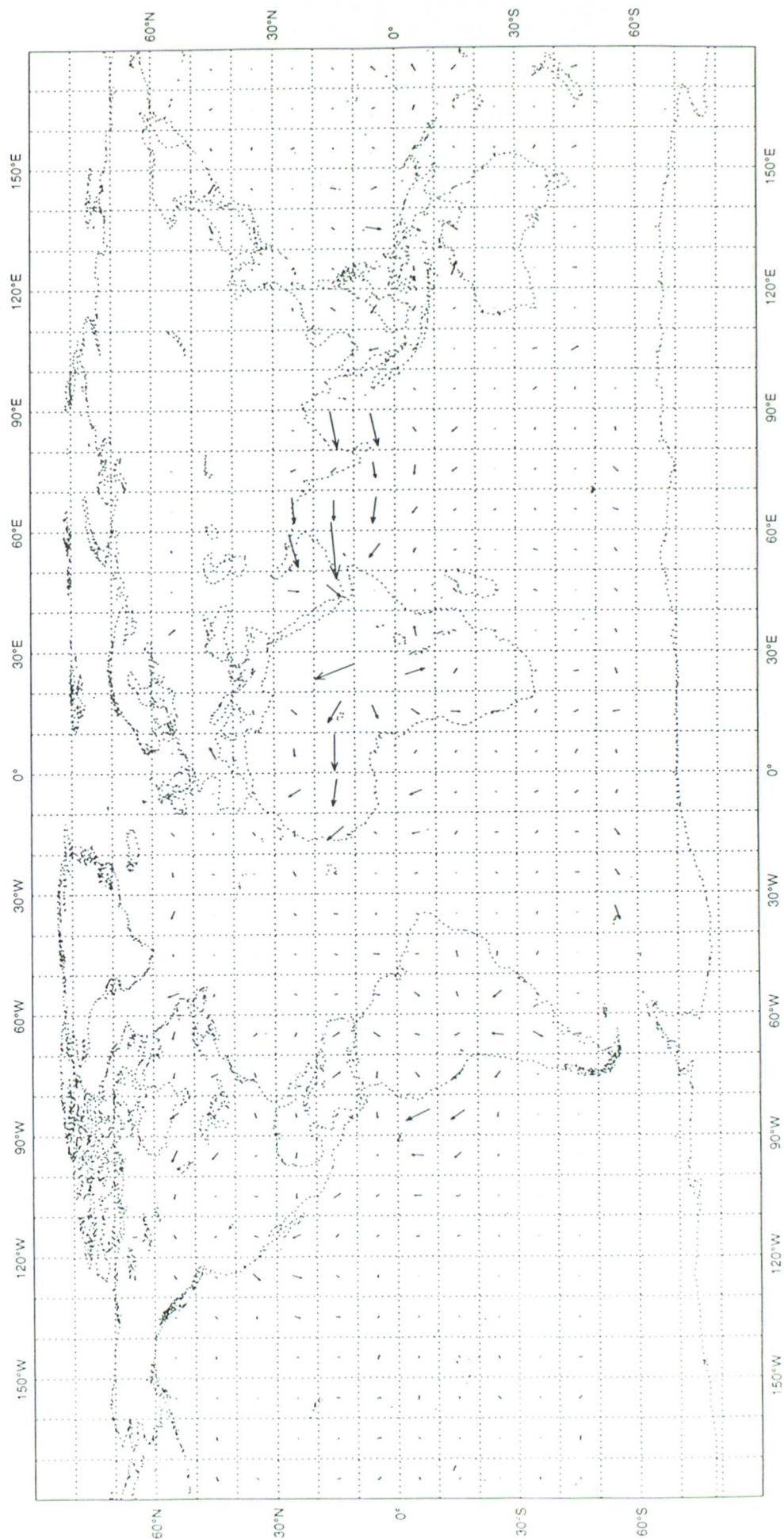


Figure 12. SATOB 701 - 1000 hPa vector wind differences. AUGUST 2002
 All observations
 Arrows are plotted where greater than 10 obs are present



10.0 m/s

Figure 13. SATOB 701 - 1000 hPa mean O-B speed differences (ms-1). AUGUST 2002
 All observations
 Values are plotted where greater than 10 obs are present

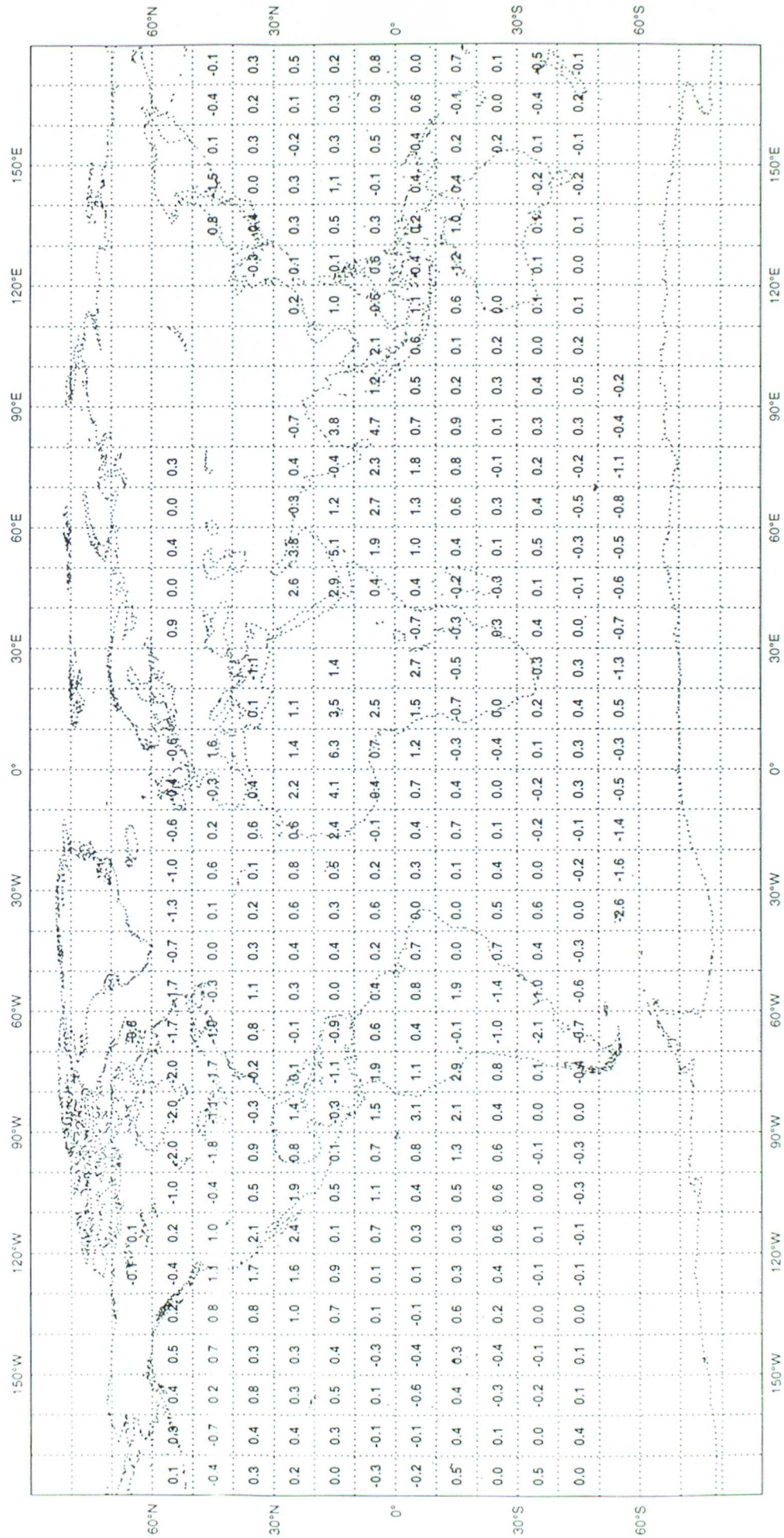


Figure 14. SATOB 701 - 1000 hPa RMS O-B vector differences (ms-1). AUGUST 2002
 All observations
 Values are plotted where greater than 10 obs are present

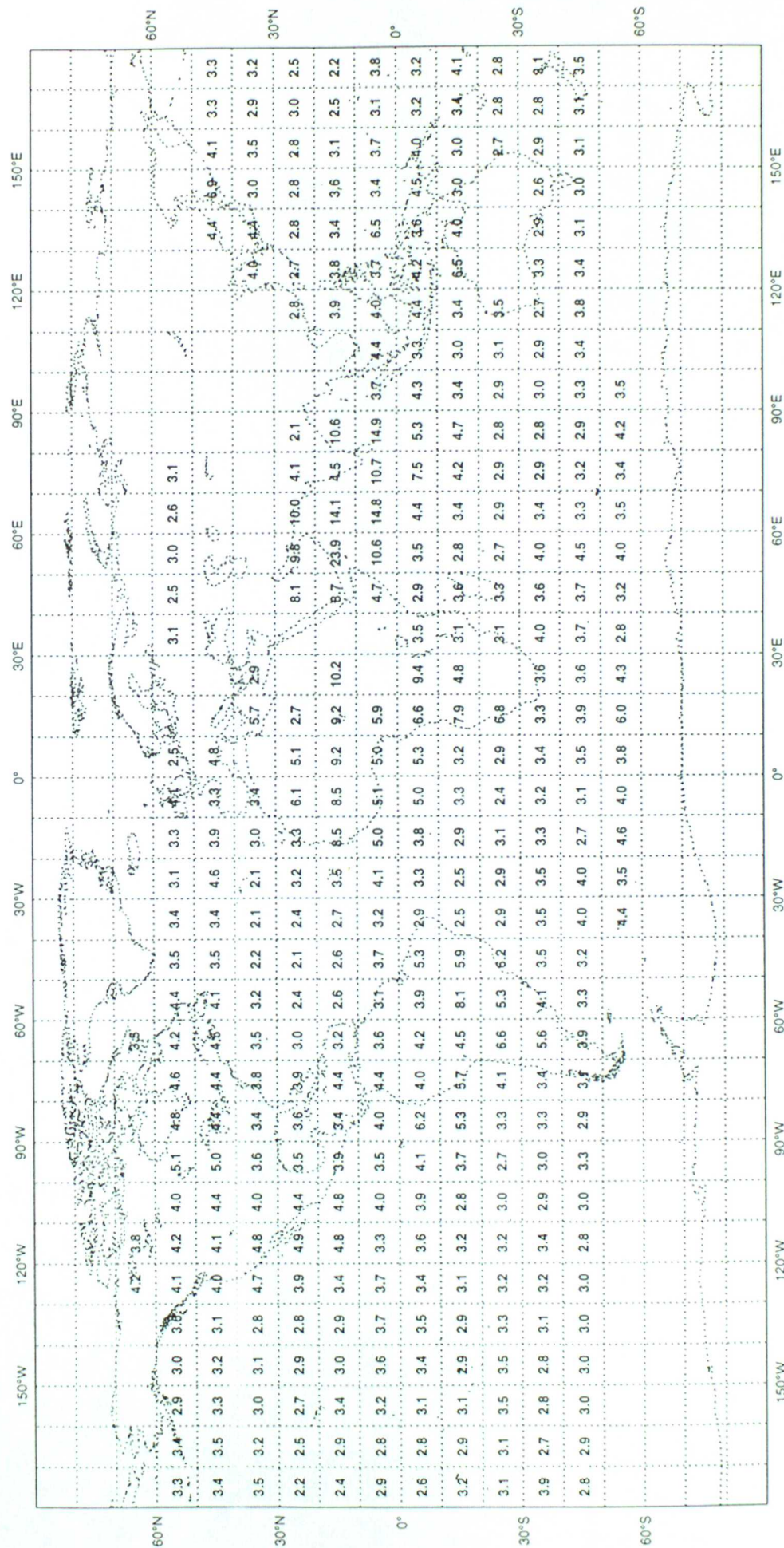


Figure 15. SATOB 401 - 700 hPa mean daily count. AUGUST 2002
Global average number of observations in 24 hours = 15258

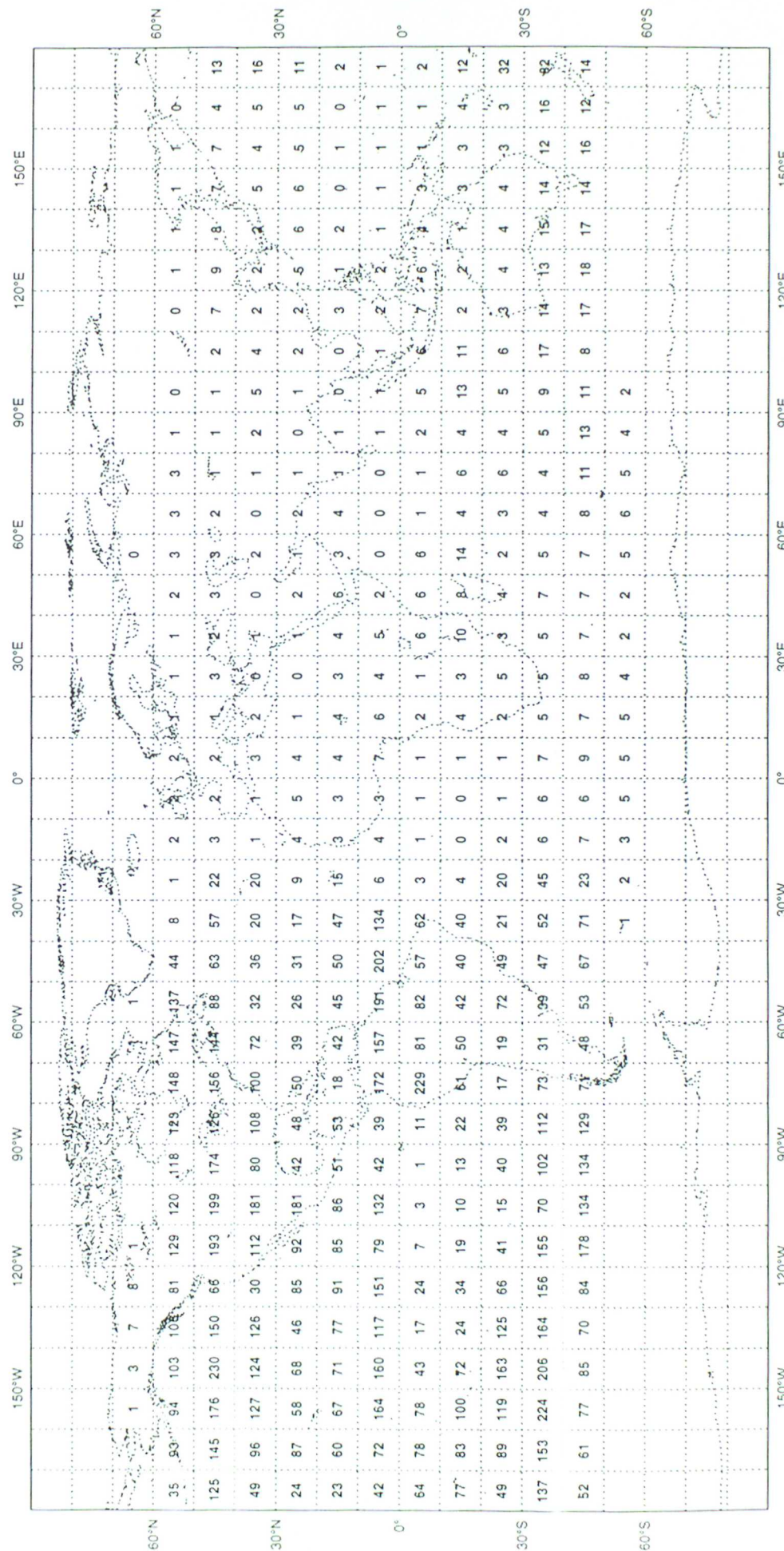
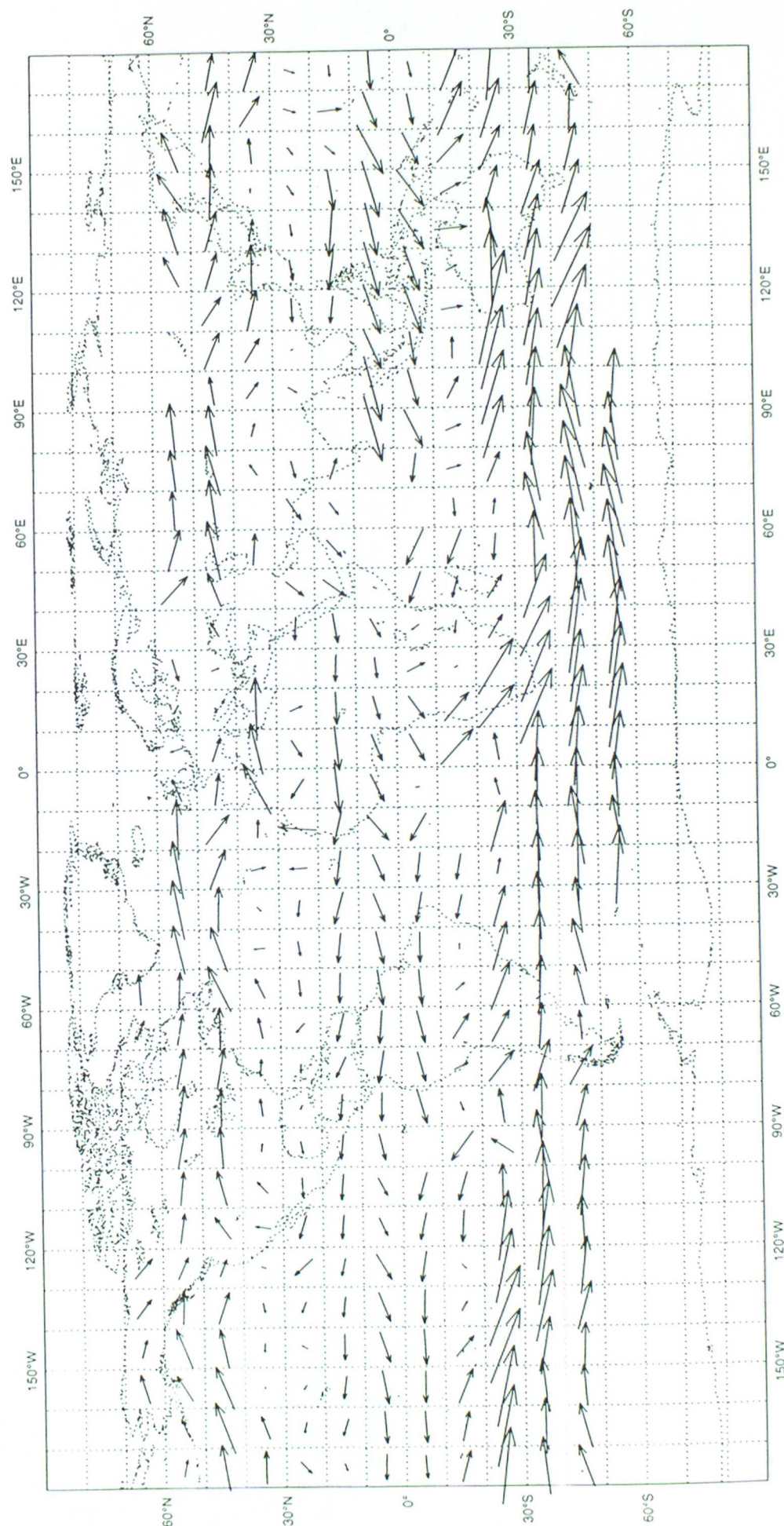


Figure 16. SATOB 401 - 700 hPa vector mean wind. AUGUST 2002
 All observations
 Arrows are plotted where greater than 10 obs are present



15.0m/s


Figure 17. SATOB 401 - 700 hPa vector wind differences. AUGUST 2002

All observations

Arrows are plotted where greater than 10 obs are present

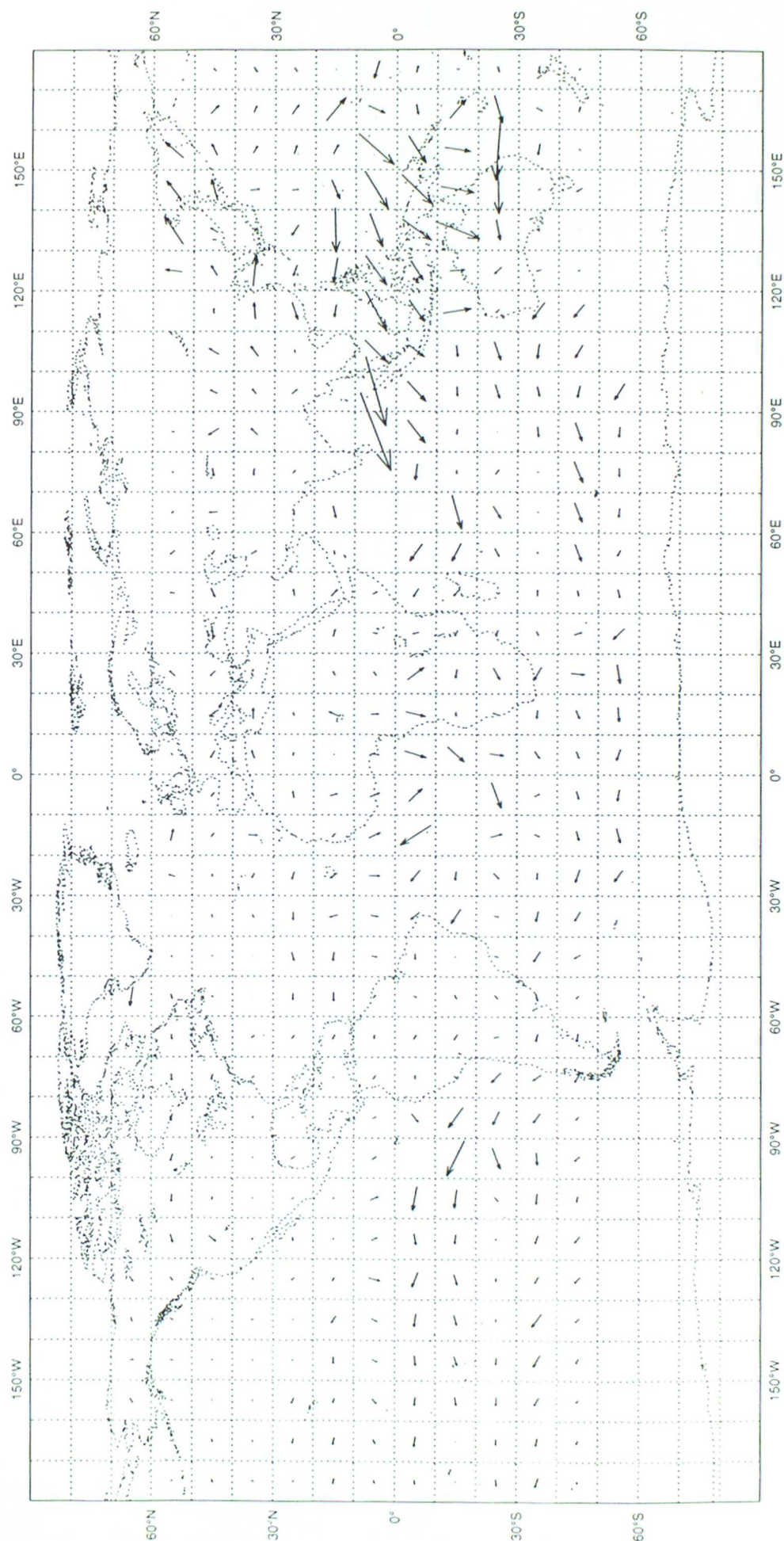


Figure 18. SATOB 401 - 700 hPa mean O-B speed differences (ms⁻¹). AUGUST 2002
All observations
Values are plotted where greater than 10 obs are present

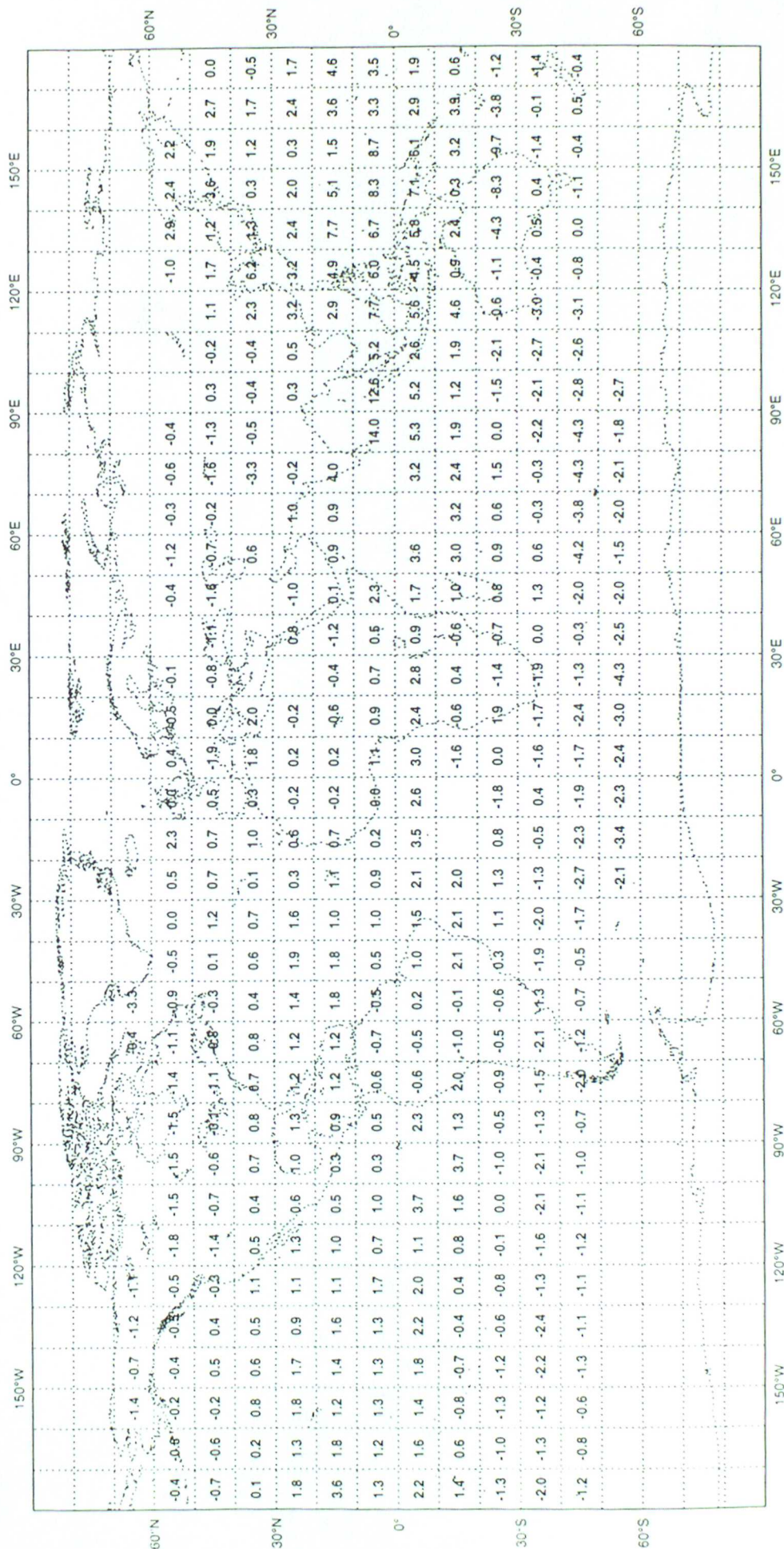


Figure 19. SATOB 401 - 700 hPa RMS O-B vector differences (ms⁻¹). AUGUST 2002
All observations
Values are plotted where greater than 10 obs are present

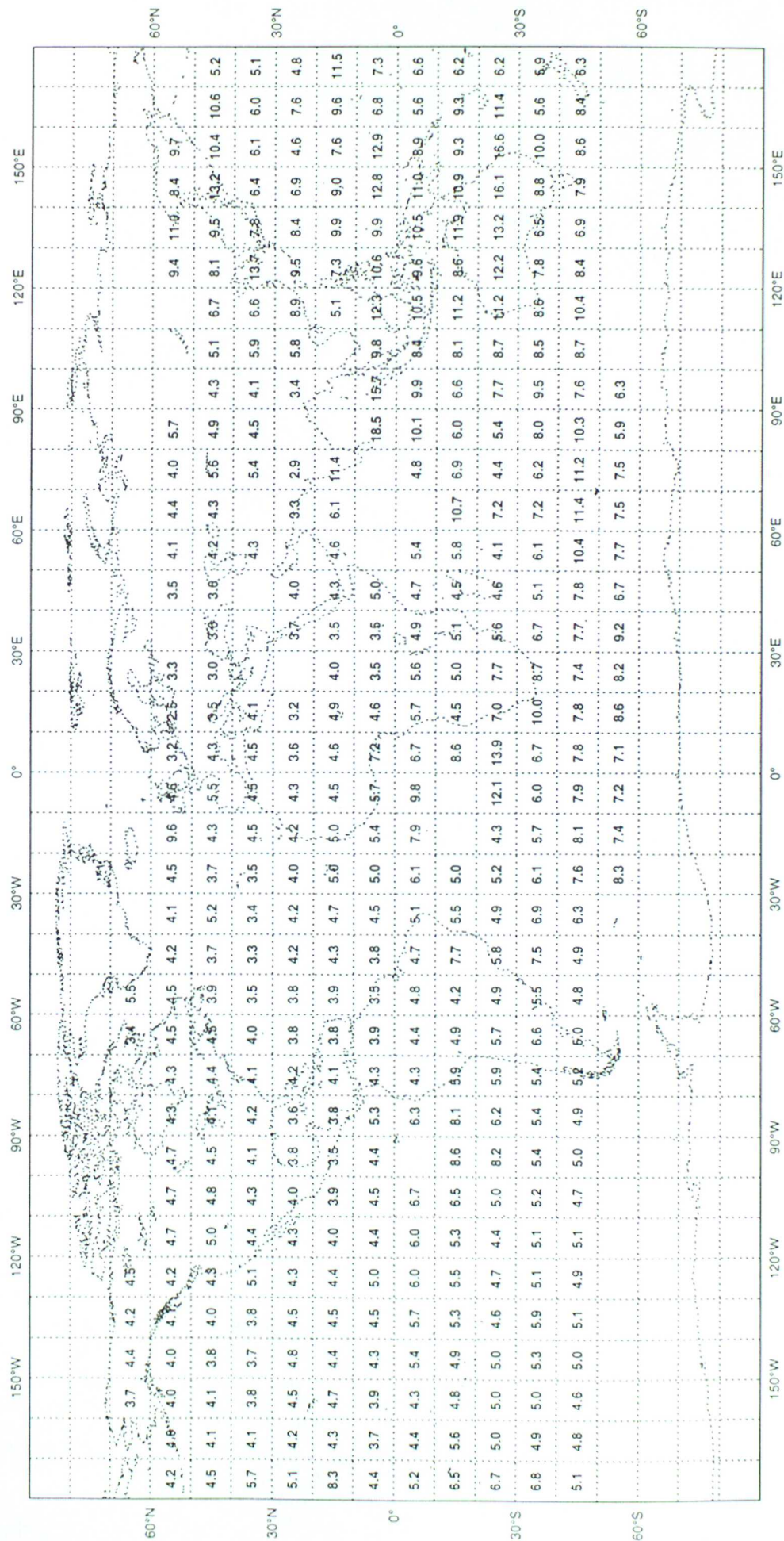


Figure 20. SATOB 101 - 400 hPa mean daily count. AUGUST 2002
Global average number of observations in 24 hours = 67995

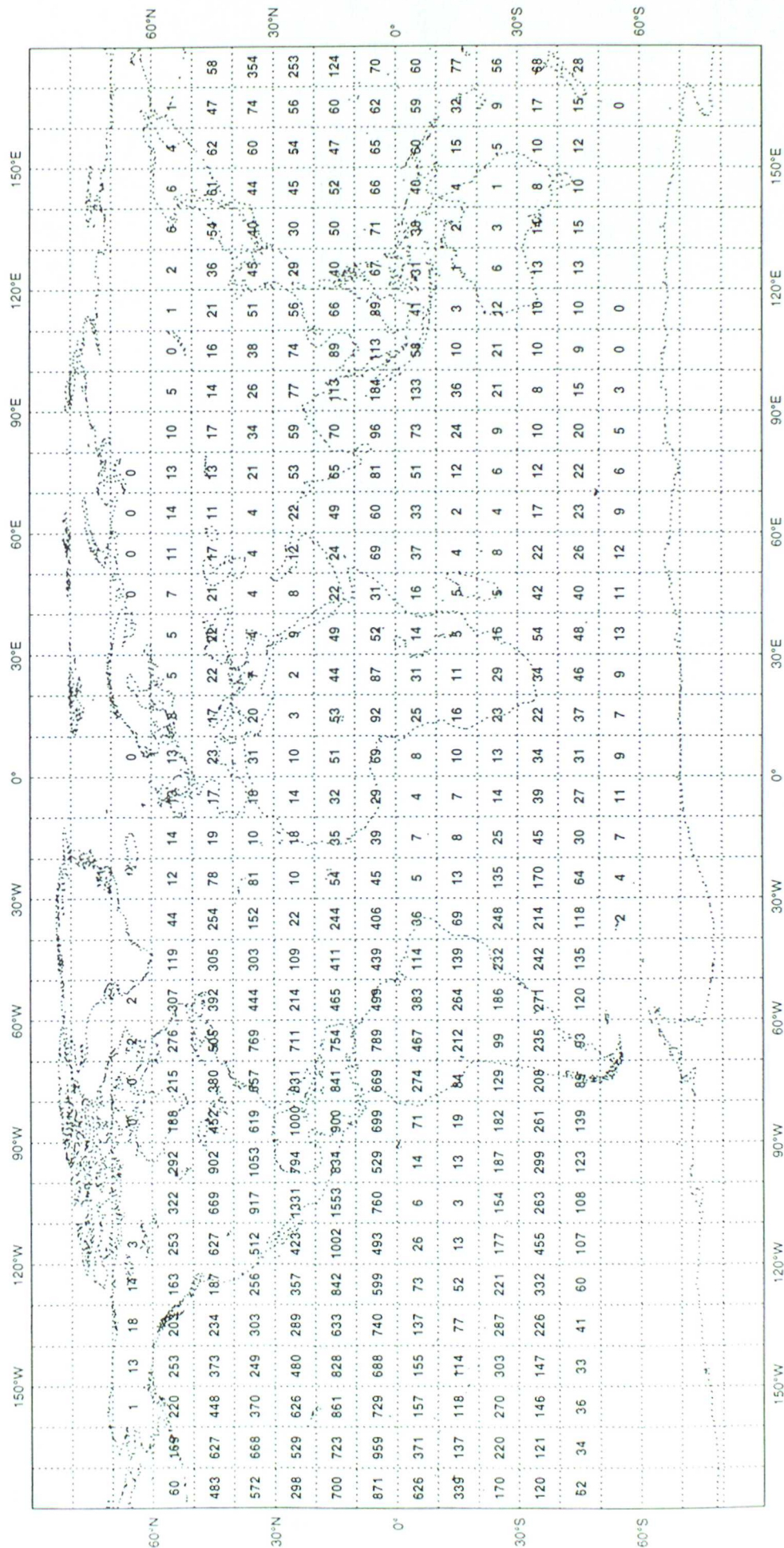


Figure 21. SATOB 101 - 400 hPa vector mean wind. AUGUST 2002
 All observations
 Arrows are plotted where greater than 10 obs are present

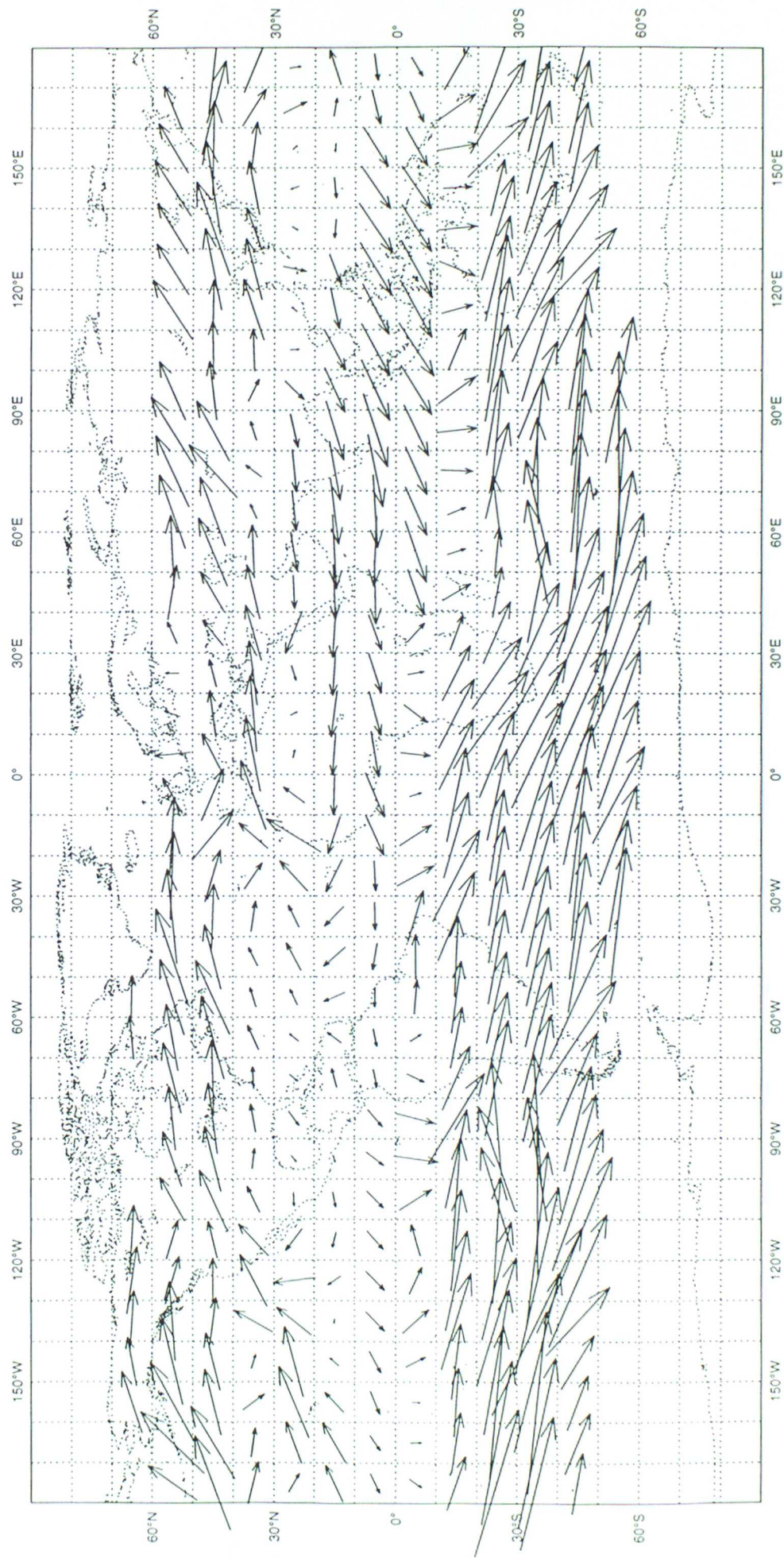


Figure 22. SATOB 101 - 400 hPa vector wind differences. AUGUST 2002
 All observations
 Arrows are plotted where greater than 10 obs are present

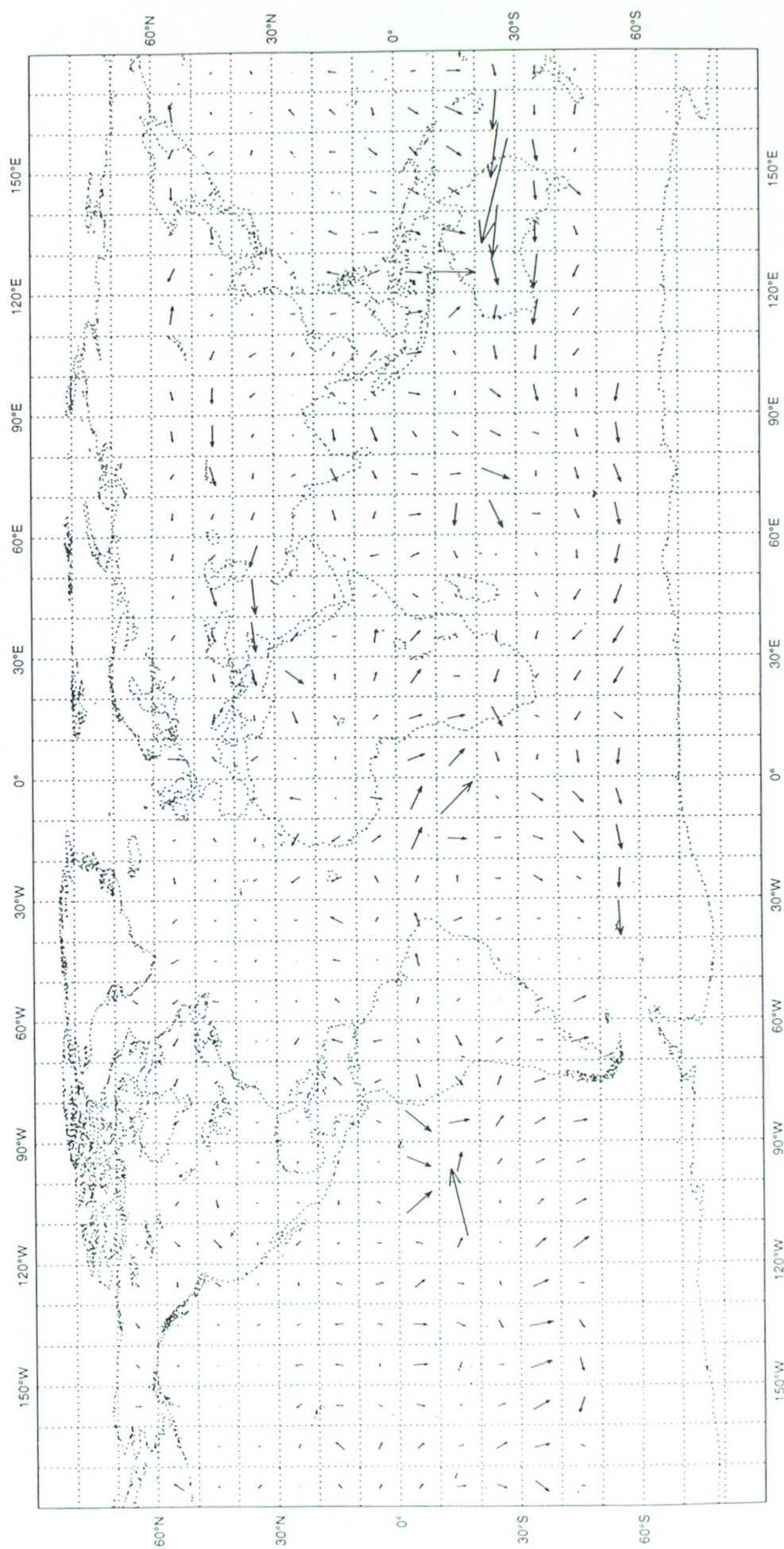


Figure 23. SATOB 101 - 400 hPa mean O-B speed differences (ms-1). AUGUST 2002
 All observations
 Values are plotted where greater than 10 obs are present

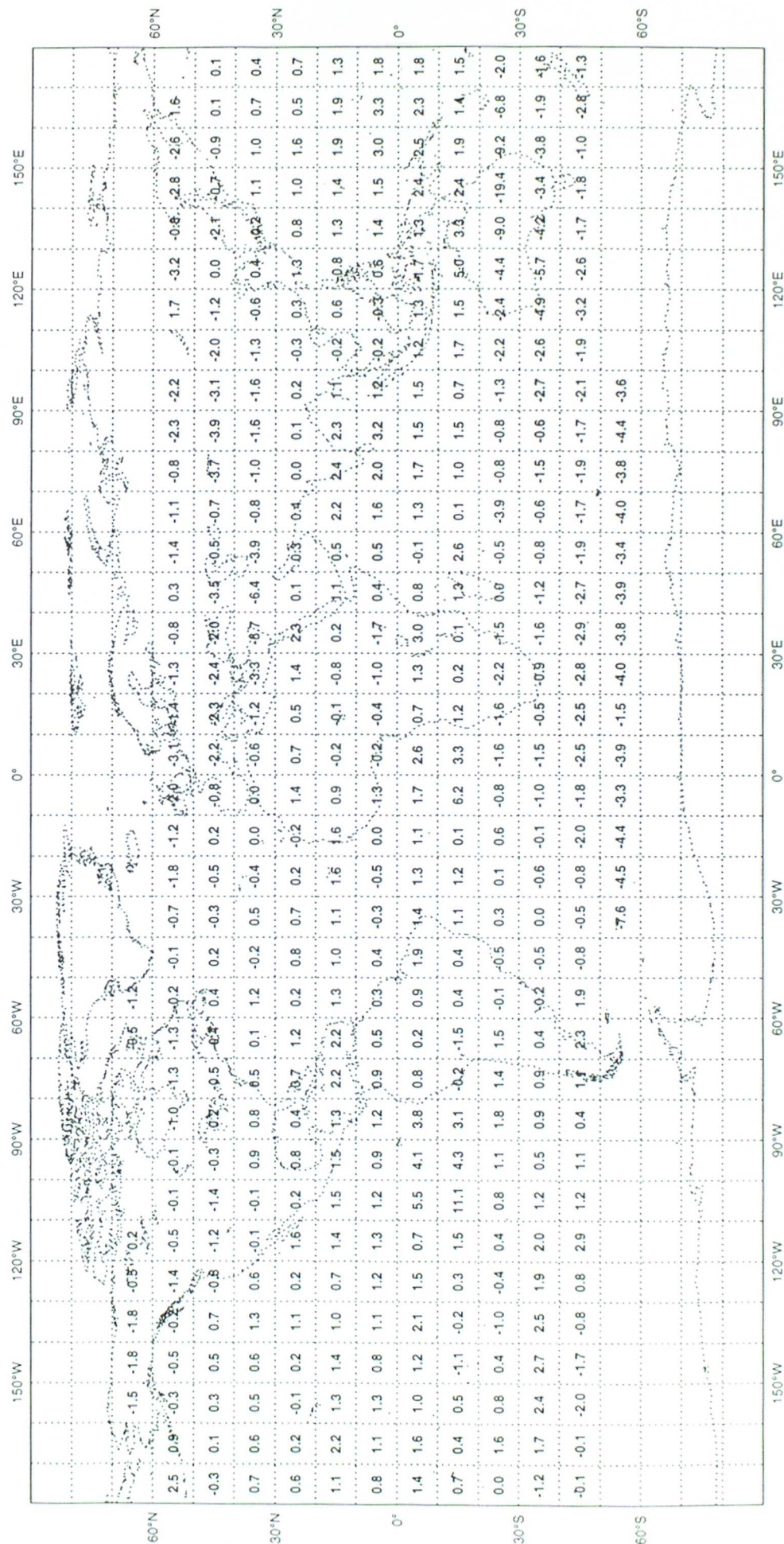
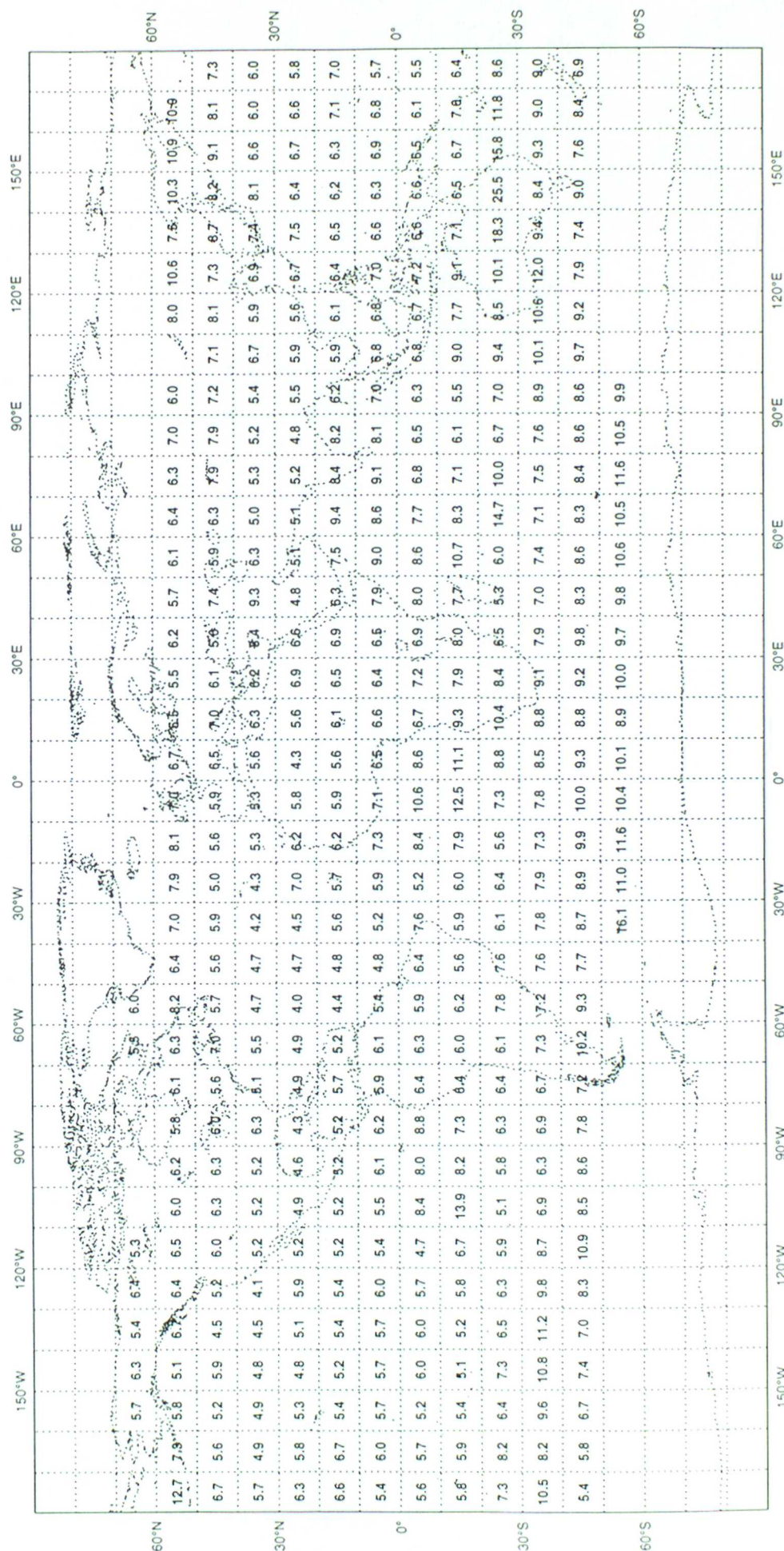


Figure 24. SATOB 101 - 400 hPa RMS O-B vector differences (ms-1). AUGUST 2002
All observations
Values are plotted where greater than 10 obs are present



MONITORING OF SATELLITE TEMPERATURES

MONITORING CENTRE: BRACKNELL

MONTH: August 2002

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from NOAA-15 and NOAA-16.

Standard of comparison :Background field from UKMO global model.

Selection Criteria :All soundings.

Data Extracted :Sounding channels (and approximate weighting function peaks, hPa)

HIRS8 (Surface)

HIRS15 (700)

HIRS11 (500-700)

HIRS4 (400)

AMSUA5 (700)

AMSUA7 (300)

AMSUA9 (100)

:Mean and standard deviation observation-minus-background brightness temperature differences

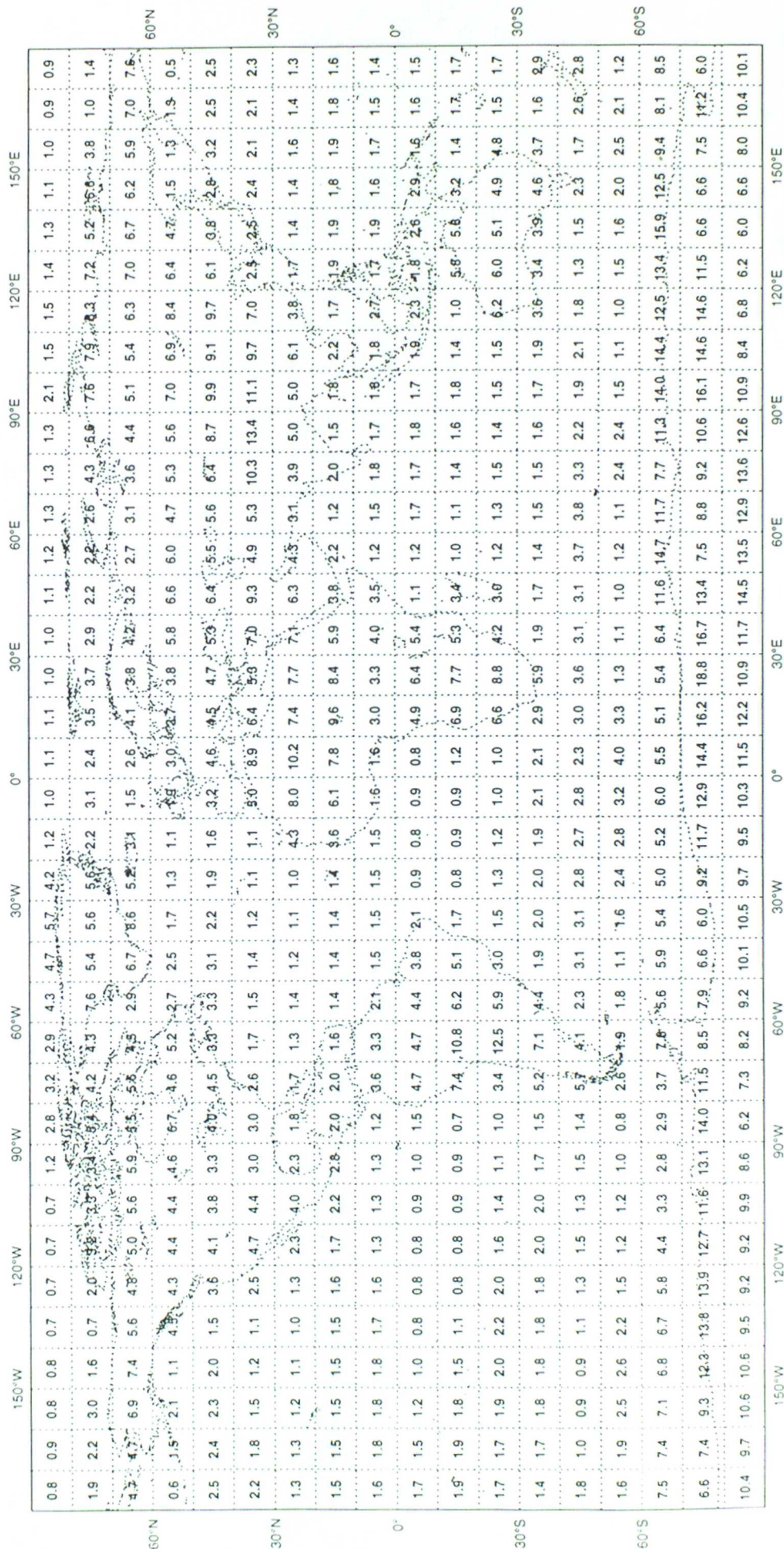
Figure 25. ATOVS mean daily count. AUGUST 2002
 NOAA15, using all observations
 Global average number of observations in 24 hours = 624090

495	505	511	507	513	510	515	522	538	546	552	566	572	573	600	631	628	624	611	590	570	551	529	502	485	474	471	465	455	453	457	461	470	475	490	
1398	1445	1458	1471	1458	1438	1429	1429	1429	1429	1429	1429	1429	1429	1429	1429	1429	1429	1429	1429	1429	1429	1429	1429	1429	1429	1429	1429	1429	1429	1429	1429	1429	1429	1429	
1064	1161	1246	1297	1277	1234	1228	1224	1222	1254	1384	1826	1827	1849	1711	1535	1360	1223	1084	974	935	979	1062	1144	1183	1201	1216	1219	1205	1173	1167	1192	1162	1090	1035	
880	956	1116	1218	1178	1195	1300	1321	1206	1134	1177	1271	1334	1346	1294	1187	1159	1035	842	848	960	1059	1107	1137	1148	1162	1182	1192	1177	1148	1144	1083	956	850		
899	908	982	1126	1119	1212	1477	1468	1172	1031	1103	1152	1217	1232	1190	1125	1120	1035	966	909	801	875	1047	1042	1067	1109	1067	1027	1127	1156	1147	1023	854	811	805	815
1083	1257	1106	1298	1381	1383	1510	1345	1102	991	1047	1176	1216	1245	1196	1106	1114	981	928	924	755	934	1074	995	982	758	510	634	830	792	724	756	760	696	803	778
969	1272	1177	1465	1523	1365	1510	1422	1080	1004	1083	1168	1184	1188	1158	1060	1099	940	949	894	656	926	972	841	609	248	80	181	430	561	761	748	648	536	831	788
620	862	885	1133	1162	951	849	726	735	880	908	1141	1305	1325	1174	1086	1007	848	893	694	540	752	897	698	440	263	119	125	248	420	569	466	540	459	576	601
410	714	906	970	959	1007	965	792	992	1276	1473	1637	1552	1328	1098	965	924	799	829	599	693	1006	1038	939	825	751	739	625	711	833	781	491	556	562	593	487
578	921	1084	984	935	927	912	882	1036	1338	1525	1530	1375	1183	1041	1010	927	870	940	705	903	1058	990	914	838	902	989	1049	1098	1095	1079	1049	976	701	579	557
67f	832	1092	956	833	889	945	937	1044	1045	1135	1157	1186	1174	973	962	790	837	873	732	1042	1045	1003	826	836	941	1041	1086	1116	1030	1310	1066	1075	931	733	784
762	753	1030	1031	1000	1067	997	980	1088	1092	1050	1154	1182	1171	1099	1032	781	826	746	720	1068	982	940	870	853	892	925	910	948	1016	1034	996	972	1035	814	831
830	740	974	1016	975	1043	993	1035	1094	1094	1124	1166	1181	1145	1093	1000	842	891	782	786	1053	1037	978	963	941	989	1057	1064	1099	1083	1127	1072	1065	1105	916	887
894	825	908	1011	1026	998	1000	1066	1120	1149	1153	1162	1154	1167	1105	967	888	862	832	955	1010	1023	996	964	984	1004	1054	1146	1202	1173	1188	1187	1185	1170	1013	939
933	825	848	960	1034	986	1025	1110	1162	1172	1185	1147	1180	1149	1061	957	899	872	909	1009	1094	1071	1060	1055	1084	1074	1103	1136	1165	1213	1225	1222	1224	1202	1097	1010
1032	935	902	951	1003	1054	1090	1144	1199	1218	1227	1126	1160	1163	1090	1016	988	999	1029	1109	1181	1192	1180	1180	1174	1115	1141	1158	1172	1166	1204	1186	1187	1174	1166	1109
1133	1116	1060	1417	978	976	1015	1026	979	1087	990	985	1130	1110	1124	1026	958	871	763	678	724	784	717	930	1193	1081	764	429	408	528	758	830	1071	870	1094	
323	345	324	332	357	336	276	213	256	326	341	332	332	339	360	347	321	277	222	206	218	180	122	121	96	104	113	129	149	241	318	331	348	387	337	

Figure 26. ATOVS MEAN O-B brightness temperature differences (deg C). AUGUST 2002
Channel: HIRS8 (Surface)
NOAA15, using all observations

60°N	-1.0	-1.1	-1.2	-1.2	-1.2	-1.3	-1.3	-1.5	-1.8	0.7	-1.1	-0.1	1.6	1.5	-0.8	-1.2	-1.3	-1.3	-1.3	-1.2	-1.1	-1.1	-1.5	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-0.9	-1.0	-0.9	-1.0	-1.0	-1.0	-1.0
	-2.0	-2.2	-1.9	-1.3	-1.3	-2.1	-2.4	-2.5	-5.1	-4.0	-4.5	-1.6	2.5	10.3	9.7	1.8	-2.7	-5.7	-8.5	-7.5	-6.5	-5.7	-4.3	-3.5	-4.7	-6.7	-9.2	-11.4	-8.6	-6.2	-3.5	-4.6	-2.5	-1.8	-1.8	-1.8	
	-15.0	-17.0	-12.8	-9.5	-8.8	-9.1	-9.6	-10.7	-11.4	-8.1	-7.1	5.0	-6.1	4.3	-2.6	7.0	-9.6	-11.6	-14.4	-17.4	-18.0	-14.7	-10.2	-8.9	-10.3	-11.8	-13.5	-14.0	-16.8	-20.0	-19.1	-15.5	-12.9	-13.5	-13.8	-14.3	
60°N	-11.1	-12.0	-13.2	-13.6	-11.9	-11.6	-14.0	-15.7	-14.4	-11.3	-13.6	-12.4	-10.3	-11.1	-12.4	-14.0	-14.6	-16.5	-18.8	-22.1	-23.7	-20.5	-17.5	-15.0	-16.0	-17.8	-17.8	-19.4	-21.9	-21.7	-16.4	-12.4	-11.1	-10.8	-11.0	-10.7	
	-13.9	-14.8	-16.1	-17.0	-17.3	-16.5	-16.8	-19.8	-20.8	-20.8	-21.8	-19.3	-17.9	-18.2	-19.9	-19.4	-18.6	-18.7	-20.5	-23.0	-24.2	-24.1	-20.9	-23.4	-24.1	-22.5	-24.1	-28.1	-32.2	-27.3	-19.5	-17.0	-14.2	-13.2	-14.0	-13.8	
	-22.1	-22.4	-21.9	-21.4	-20.2	-19.1	-23.7	-23.4	-26.2	-25.0	-24.5	-24.2	-23.8	-23.8	-23.6	-22.5	-21.7	-25.1	-31.1	-28.9	-26.7	-27.0	-27.4	-24.9	-24.3	-16.8	-19.4	-20.3	-27.8	-27.8	-23.1	-23.7	-23.0	-22.7	-22.0		
30°N	-25.0	-24.3	-23.4	-22.7	-21.8	-21.4	-23.5	-23.4	-25.7	-25.3	-25.1	-24.9	-24.5	-23.9	-23.0	-25.0	-33.9	-38.8	-42.5	-37.2	-30.8	-29.8	-25.9	-27.3	-26.8	-20.2	-20.0	-24.4	-25.4	-25.2	-25.0	-24.9	-24.7	-25.2	-24.8		
	-24.3	-24.2	-23.7	-23.6	-23.4	-23.2	-23.3	-23.9	-23.2	-24.3	-25.4	-25.1	-25.1	-24.0	-23.2	-23.1	-25.6	-28.6	-30.7	-35.1	-29.3	-23.8	-24.9	-24.7	-24.0	-23.0	-23.7	-22.2	-22.8	-24.2	-24.0	-23.2	-24.2	-24.1	-24.5	-24.3	
	-23.7	-24.5	-24.3	-23.6	-23.5	-23.4	-23.0	-22.4	-22.3	-22.4	-21.5	-22.7	-23.3	-23.6	-23.0	-22.5	-22.2	-21.6	-21.7	-22.1	-22.1	-19.1	-22.9	-24.1	-24.7	-24.3	-24.2	-23.9	-24.3	-23.6	-24.1	-24.0	-23.6	-23.5	-23.3		
0°	-25.0	-25.9	-26.1	-25.9	-25.5	-25.0	-24.2	-23.2	-22.0	-20.6	-22.0	-27.0	-26.5	-25.1	-23.7	-24.0	-23.2	-22.5	-22.3	-24.5	-24.0	-19.5	-23.6	-23.9	-23.6	-23.9	-23.9	-24.7	-26.1	-25.0	-24.9	-23.4	-22.0	-23.4	-23.4	-23.9	
	-23.3	-24.0	-24.8	-24.9	-25.1	-24.6	-23.7	-22.8	-21.7	-20.0	-16.2	-21.0	-25.5	-21.5	-23.5	-23.3	-22.3	-21.3	-20.4	-21.4	-23.1	-20.4	-22.6	-23.0	-23.1	-22.3	-22.2	-23.1	-24.1	-25.2	-22.4	-20.1	-21.8	-23.4	-23.1	-23.2	
30°S	-20.5	-20.3	-20.3	-20.3	-21.0	-21.6	-21.5	-20.6	-19.5	-18.4	-16.5	-11.5	-18.9	-19.6	-21.8	-21.2	-20.4	-19.7	-18.8	-15.2	-16.1	-21.0	-21.6	-21.5	-20.5	-19.9	-19.5	-19.8	-20.6	-17.1	-11.8	-10.6	-12.9	-19.2	-20.7	-20.6	
	-15.9	-15.1	-15.1	-15.0	-15.2	-15.3	-15.5	-15.5	-15.2	-14.4	-11.4	-9.4	-13.7	-17.3	-16.7	-15.9	-15.3	-15.0	-15.0	-15.3	-15.1	-18.3	-17.8	-17.0	-15.8	-14.8	-14.1	-14.0	-14.8	-14.4	-13.7	-13.1	-8.4	-16.5	-16.6	-15.4	
	-11.5	-10.7	-10.3	-10.1	-10.1	-10.2	-10.3	-10.0	-9.7	-9.5	-6.3	-6.4	-8.4	-9.3	-8.1	-8.2	-7.9	-7.0	-7.2	-8.1	-9.1	-9.0	-8.1	-9.1	-9.2	-8.9	-9.4	-9.3	-9.2	-9.8	-10.2	-10.8	-11.1	-12.1	-11.4	-10.0	
	-6.6	-6.1	-5.4	-5.4	-5.8	-6.2	-6.2	-6.5	-6.3	-6.3	-5.7	-5.0	-3.6	-1.9	-1.5	-0.9	-0.7	0.4	0.9	0.2	-1.4	-2.3	-2.1	-2.6	-2.6	-1.3	-1.8	-2.5	-3.2	-4.3	-4.6	-4.4	-5.9	-7.2	-7.0		
60°S	3.8	3.8	4.3	3.8	2.6	1.4	0.4	-0.1	-0.3	-0.5	0.7	4.8	4.5	6.8	7.5	7.9	8.7	9.8	9.6	9.5	8.6	8.4	11.1	16.8	14.9	12.9	15.4	15.0	14.2	10.4	9.0	11.8	9.7	7.2	6.4	5.3	
	18.0	16.4	15.1	16.2	17.8	17.5	14.9	12.3	15.7	17.6	16.5	19.5	14.1	13.6	13.0	16.4	21.8	31.3	36.7	39.5	39.1	43.7	50.1	51.4	42.5	42.5	49.2	58.4	56.4	52.8	55.6	52.8	48.9	44.7	28.6	20.9	
	29.7	29.1	28.6	32.2	32.6	32.0	32.7	35.7	38.9	36.0	30.9	27.6	27.7	27.7	29.6	33.2	36.3	39.2	43.0	46.7	51.4	56.2	63.8	67.0	64.9	65.4	64.3	62.3	56.6	55.1	53.0	50.0	46.6	42.3	33.4	30.6	

Figure 27. ATOVS SD O-B brightness temperature differences (deg C). AUGUST 2002
 Channel: HIRS8 (Surface)
 NOAA15, using all observations



NOAA15, using all observations

60°N	1.2	1.3	1.4	1.5	1.6	1.7	1.7	1.8	1.8	1.7	2.0	1.7	1.8	2.1	1.9	1.2	1.0	0.8	0.6	0.5	0.4	0.4	0.4	0.5	0.6	0.7	0.8	0.9	1.1	1.3	1.4	1.4	1.4	1.3	1.3		
	0.5	0.7	0.8	1.1	1.2	1.4	1.3	1.3	1.4	1.3	0.8	1.3	2.3	4.1	3.7	1.4	-0.1	-1.0	-1.8	-1.7	-1.4	-0.9	-0.6	-0.4	-0.4	-0.8	-1.4	-2.0	-2.5	-2.0	-1.5	-0.9	-0.8	0.1	0.3		
	1.2	1.6	2.0	1.4	1.1	1.2	1.3	1.7	1.9	1.2	0.8	0.2	0.1	2.0	0.6	-0.9	-0.7	-2.8	-3.9	-4.7	-4.8	-2.9	-1.2	-1.0	-1.3	-1.8	-2.5	-3.0	-4.2	-5.3	-5.2	-4.0	-3.5	-3.3	-2.4		
60°N	-2.6	-2.4	-3.9	-4.0	-3.8	-3.7	-4.2	-5.1	-4.8	-3.6	-3.9	-3.2	-2.8	-3.3	-3.6	-4.1	-4.1	-6.8	-5.6	-4.0	-3.1	-5.3	-4.6	-3.6	-3.8	-4.8	-5.2	-6.1	-7.1	-7.2	-5.5	-3.7	-2.9	-3.5	-2.5	-2.4	
	-5.7	-5.6	-6.4	-7.0	-6.5	-6.7	-7.5	-8.8	-8.3	-8.1	-8.0	-7.2	-7.3	-7.7	-7.6	-7.1	-6.5	-6.5	-6.5	-8.3	-7.3	-8.0	-8.1	-8.3	-9.3	-9.6	-10.4	-11.7	-12.5	-10.1	-7.6	-7.1	-6.3	-6.3	-5.9	-4.6	
	-9.7	-9.5	-8.0	-8.3	-8.1	-9.5	-11.9	-11.3	-11.0	-10.3	-10.1	-9.6	-9.3	-9.0	-8.3	-8.6	-10.4	-11.7	-11.7	-10.4	-12.5	-13.6	-12.9	-13.2	-11.3	-12.2	-12.9	-13.2	-12.2	-11.5	-11.3	-11.2	-10.4	-10.6	-8.9	-8.9	
30°N	-10.2	-10.3	-9.3	-9.7	-9.7	-10.1	-11.7	-11.9	-11.4	-11.3	-10.9	-10.6	-10.2	-10.1	-10.2	-9.9	-11.7	-14.1	-15.9	-16.6	-14.1	-14.8	-15.0	-15.2	-14.5	-14.3	-12.8	-12.2	-12.4	-13.0	-12.6	-12.1	-12.3	-11.2	-11.9	-10.4	
	-10.9	-11.5	-11.3	-11.4	-11.3	-11.0	-11.4	-11.4	-11.3	-11.3	-11.0	-11.0	-11.0	-11.0	-10.9	-10.9	-10.9	-12.2	-12.5	-13.8	-14.7	-13.2	-12.2	-12.8	-12.6	-11.9	-12.1	-12.1	-11.7	-11.3	-12.5	-12.4	-12.0	-12.5	-11.5	-12.3	-11.3
	-11.6	-12.1	-11.9	-11.6	-11.5	-11.4	-11.3	-11.1	-10.9	-11.4	-10.8	-10.8	-10.8	-10.8	-10.8	-10.5	-10.8	-10.2	-10.8	-10.7	-10.9	-10.1	-10.9	-11.1	-11.2	-11.5	-11.6	-11.4	-11.5	-11.5	-11.5	-11.4	-11.3	-11.1	-11.6	-11.8	-12.1
0°	-11.8	-12.4	-12.1	-11.8	-11.6	-11.5	-11.3	-11.0	-10.6	-10.6	-10.6	-11.7	-11.6	-11.0	-10.6	-10.7	-10.6	-10.3	-10.7	-10.9	-11.5	-9.7	-10.4	-10.9	-10.8	-11.1	-11.4	-11.5	-11.5	-11.5	-11.4	-11.3	-11.1	-11.6	-11.8	-12.1	
	-10.7	-10.9	-11.2	-10.9	-10.8	-10.6	-10.3	-9.9	-9.7	-9.4	-8.7	-9.8	-10.8	-9.3	-9.3	-9.8	-9.2	-9.5	-9.6	-9.5	-10.7	-9.1	-9.5	-9.8	-9.9	-10.1	-10.3	-10.6	-11.0	-11.1	-10.8	-10.3	-10.4	-10.9	-10.6	-11.5	
	-6.9	-6.7	-7.4	-7.3	-7.6	-8.1	-8.0	-7.6	-7.2	-6.6	-6.6	-6.0	-7.5	-7.0	-7.0	-7.1	-5.9	-6.3	-5.9	-5.6	-7.1	-7.5	-7.4	-6.9	-6.0	-5.9	-6.1	-6.3	-7.1	-7.0	-6.2	-5.3	-5.3	-6.4	-7.4	-7.4	
30°S	-1.6	-0.5	-1.5	-1.4	-1.8	-2.7	-3.2	-3.0	-2.5	-2.0	-1.5	-2.0	-3.2	-3.8	-3.4	-3.6	-2.1	-2.6	-1.6	-1.8	-3.6	-4.5	-4.1	-3.5	-2.2	-1.6	-1.3	-1.0	-1.4	-1.4	-1.6	-1.3	0.0	-2.1	-1.6	-1.5	
	1.0	2.2	2.0	2.2	2.3	2.3	2.1	1.8	1.9	2.1	3.0	2.5	1.5	1.2	1.7	2.4	2.9	3.0	3.9	2.4	1.5	1.1	1.0	1.0	1.4	2.1	2.5	2.6	2.3	2.0	1.6	1.4	1.4	0.8	1.0	1.6	
	4.1	4.4	5.2	4.9	5.1	5.6	5.0	4.8	5.1	5.2	5.5	5.0	6.9	7.5	7.7	8.6	8.2	9.0	9.5	8.4	8.0	7.1	6.7	6.7	6.5	7.2	7.4	6.8	6.5	5.8	5.1	4.7	4.5	4.2	3.7	4.3	
60°S	10.1	10.0	10.5	10.1	9.7	9.5	8.9	8.7	8.8	9.1	9.8	11.1	11.6	12.4	12.8	13.0	13.2	13.7	13.6	13.6	13.5	13.5	14.0	15.4	14.7	13.9	14.6	14.6	13.7	12.2	11.4	11.8	11.1	10.4	10.3	10.4	
	17.7	16.9	16.4	16.3	16.1	15.0	14.2	15.0	15.6	15.4	16.3	15.3	15.4	15.4	16.0	17.9	20.6	22.4	23.5	24.7	26.4	26.7	23.8	23.6	25.4	27.0	26.2	25.2	26.9	26.1	24.3	23.5	19.8	18.7	18.7		
	21.7	21.4	21.0	21.4	21.6	21.7	22.1	23.1	24.0	23.0	21.4	20.6	20.5	20.5	21.1	22.0	23.1	24.0	25.2	26.5	28.3	30.2	32.2	33.4	33.0	32.7	32.2	30.8	30.3	29.2	27.8	26.5	25.0	23.0	22.3	22.3	

Figure 29. ATOVS SD O-B brightness temperature differences (deg C). AUGUST 2002
 Channel: HIRS15 (700 hPa)
 NOAA15, using all observations

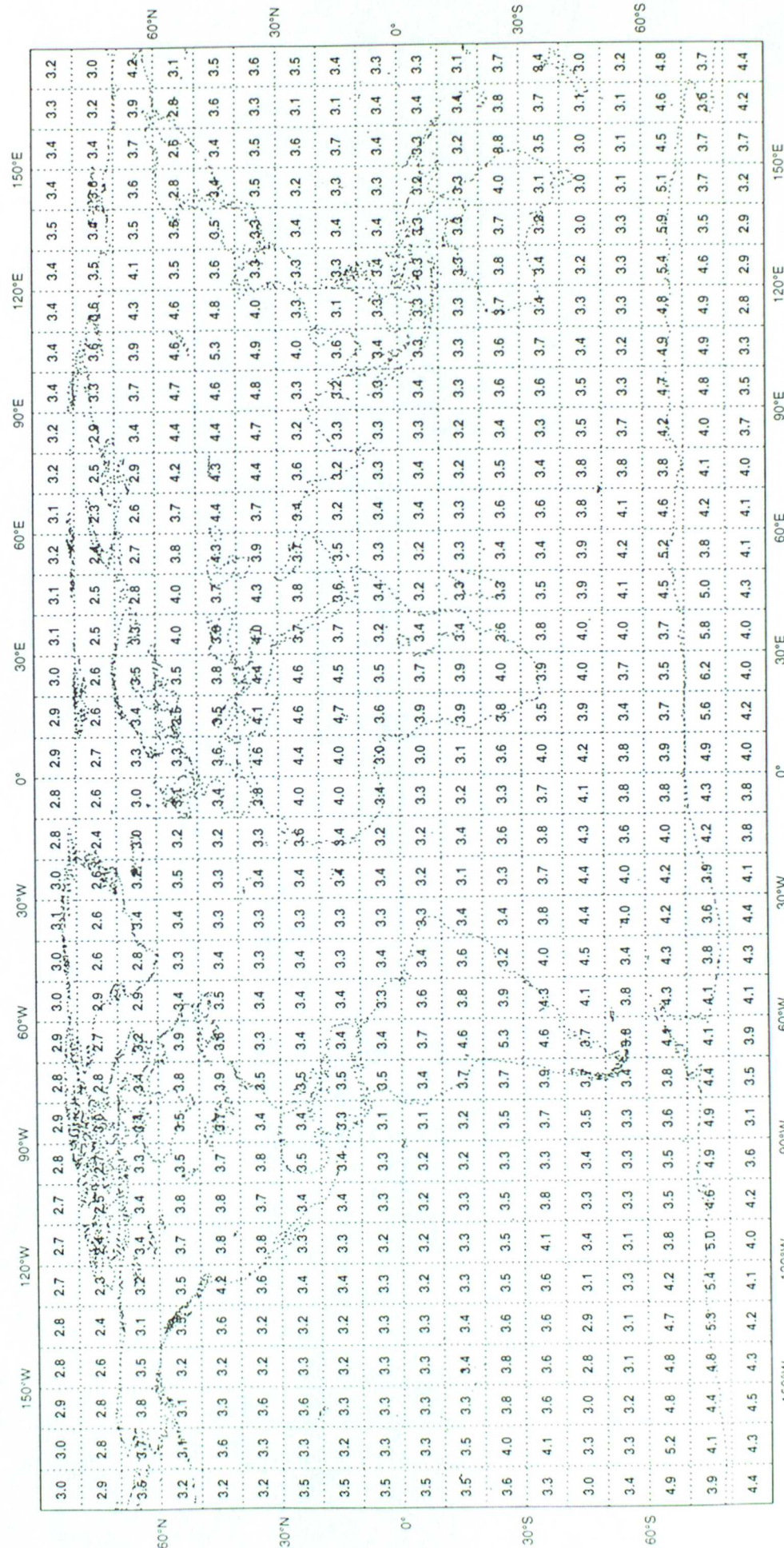


Figure 31. ATOVS SD O-B brightness temperature differences (deg C). AUGUST 2002
 Channel: HIRS11 (500 - 700 hPa)
 NOAA15, using all observations

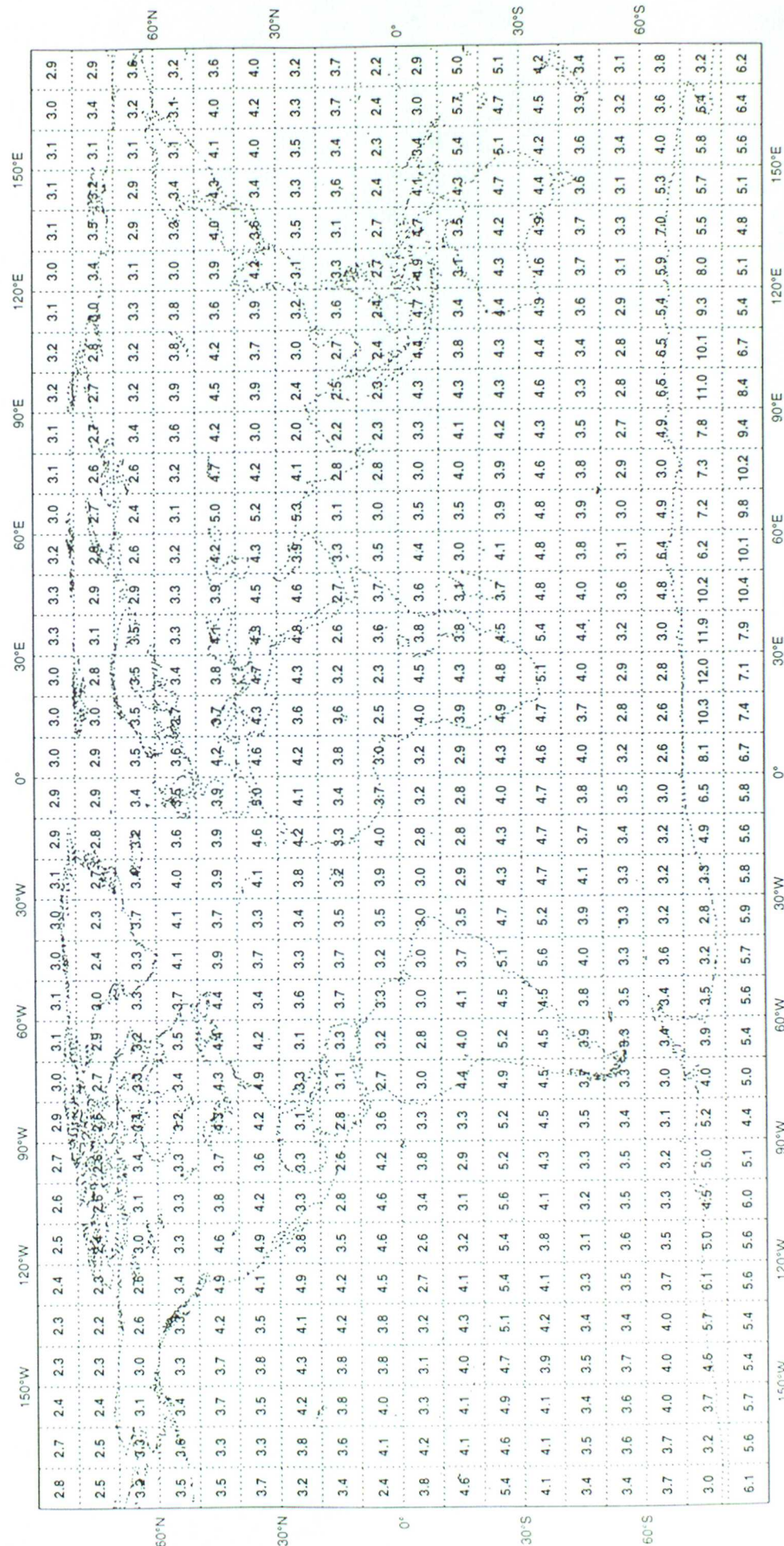


Figure 32. ATOVS MEAN O-B brightness temperature differences (deg C). AUGUST 2002
Channel: HIRS4 (400 hPa)
NOAA15, using all observations

	150°W	120°W	90°W	60°W	30°W	0°	30°E	60°E	90°E	120°E	150°E	
60°N	-7.8	-7.9	-7.9	-7.6	-7.5	-7.5	-7.3	-7.4	-7.5	-7.5	-7.6	-7.7
	-7.3	-7.4	-7.6	-7.3	-7.2	-7.4	-7.3	-7.5	-7.6	-7.5	-7.4	-7.2
	-6.2	-6.5	-6.6	-6.7	-6.7	-6.6	-6.2	-6.7	-7.1	-6.8	-6.4	-6.4
	-6.2	-5.9	-6.1	-5.8	-6.2	-6.1	-5.7	-6.2	-6.2	-6.0	-5.9	-5.8
	-5.9	-5.3	-5.1	-5.3	-5.2	-5.3	-5.1	-5.7	-6.0	-5.7	-5.7	-5.6
	-4.9	-4.7	-3.9	-4.3	-4.8	-4.9	-4.7	-4.4	-4.3	-4.2	-4.3	-4.6
	-3.9	-4.1	-3.7	-4.1	-4.2	-4.2	-4.5	-4.5	-4.7	-4.6	-4.6	-4.3
	-3.7	-4.1	-4.0	-4.1	-3.9	-3.7	-3.5	-3.5	-3.8	-3.7	-3.8	-3.8
	-3.7	-4.1	-4.0	-4.0	-3.9	-3.6	-3.4	-3.4	-3.5	-3.6	-3.7	-3.9
	-3.8	-4.3	-4.3	-4.1	-4.1	-4.0	-3.8	-3.6	-3.5	-3.6	-3.8	-4.0
	-3.6	-3.8	-3.9	-3.7	-3.7	-3.6	-3.6	-3.5	-3.7	-3.8	-4.2	-4.2
	-3.1	-2.9	-3.1	-2.7	-2.5	-2.2	-2.1	-2.2	-2.9	-3.1	-3.5	-3.7
	-2.8	-2.4	-2.8	-2.3	-2.2	-1.9	-1.2	-1.6	-1.7	-2.0	-2.3	-2.6
	-3.3	-3.0	-3.0	-2.8	-2.3	-1.9	0.1	-0.3	-0.8	-1.4	-2.0	-3.1
	-2.2	-1.6	-0.8	-0.7	0.2	1.0	1.6	1.7	1.2	0.8	1.3	-2.5
	2.7	3.4	4.5	5.3	6.1	7.0	7.7	8.4	9.1	9.8	10.5	11.4
	9.7	10.1	10.6	11.2	11.8	12.3	12.6	13.0	13.4	13.6	14.0	14.2
	14.8	14.9	15.0	15.2	15.4	15.7	16.2	16.3	16.1	16.0	15.4	15.0
60°S	-7.8	-7.9	-7.9	-7.6	-7.5	-7.5	-7.3	-7.4	-7.5	-7.5	-7.6	-7.7
	-7.3	-7.4	-7.6	-7.3	-7.2	-7.4	-7.3	-7.5	-7.6	-7.5	-7.4	-7.2
	-6.2	-6.5	-6.6	-6.7	-6.7	-6.6	-6.2	-6.7	-7.1	-6.8	-6.4	-6.4
	-6.2	-5.9	-6.1	-5.8	-6.2	-6.1	-5.7	-6.2	-6.2	-6.0	-5.9	-5.8
	-5.9	-5.3	-5.1	-5.3	-5.2	-5.3	-5.1	-5.7	-6.0	-5.7	-5.7	-5.6
	-4.9	-4.7	-3.9	-4.3	-4.8	-4.9	-4.7	-4.4	-4.3	-4.2	-4.3	-4.6
	-3.9	-4.1	-3.7	-4.1	-4.2	-4.2	-4.5	-4.5	-4.7	-4.6	-4.6	-4.3
	-3.7	-4.1	-4.0	-4.1	-3.9	-3.7	-3.5	-3.5	-3.8	-3.7	-3.8	-3.8
	-3.7	-4.1	-4.0	-4.0	-3.9	-3.6	-3.4	-3.4	-3.5	-3.6	-3.7	-3.9
	-3.8	-4.3	-4.3	-4.1	-4.1	-4.0	-3.8	-3.6	-3.5	-3.6	-3.8	-4.0
	-3.6	-3.8	-3.9	-3.7	-3.7	-3.6	-3.6	-3.5	-3.7	-3.8	-4.2	-4.2
	-3.1	-2.9	-3.1	-2.7	-2.5	-2.2	-2.1	-2.2	-2.9	-3.1	-3.5	-3.7
	-2.8	-2.4	-2.8	-2.3	-2.2	-1.9	-1.2	-1.6	-1.7	-2.0	-2.3	-2.6
	-3.3	-3.0	-3.0	-2.8	-2.3	-1.9	0.1	-0.3	-0.8	-1.4	-2.0	-3.1
	-2.2	-1.6	-0.8	-0.7	0.2	1.0	1.6	1.7	1.2	0.8	1.3	-2.5
	2.7	3.4	4.5	5.3	6.1	7.0	7.7	8.4	9.1	9.8	10.5	11.4
	9.7	10.1	10.6	11.2	11.8	12.3	12.6	13.0	13.4	13.6	14.0	14.2
	14.8	14.9	15.0	15.2	15.4	15.7	16.2	16.3	16.1	16.0	15.4	15.0

NOAA15, using all observations



Channel: AMSUA-5 (700 hPa)



Figure 36. ATOVS MEAN O-B brightness temperature differences (deg C). AUGUST 2002
Channel: AMSUA-7 (300 hPa)
NOAA15, using all observations

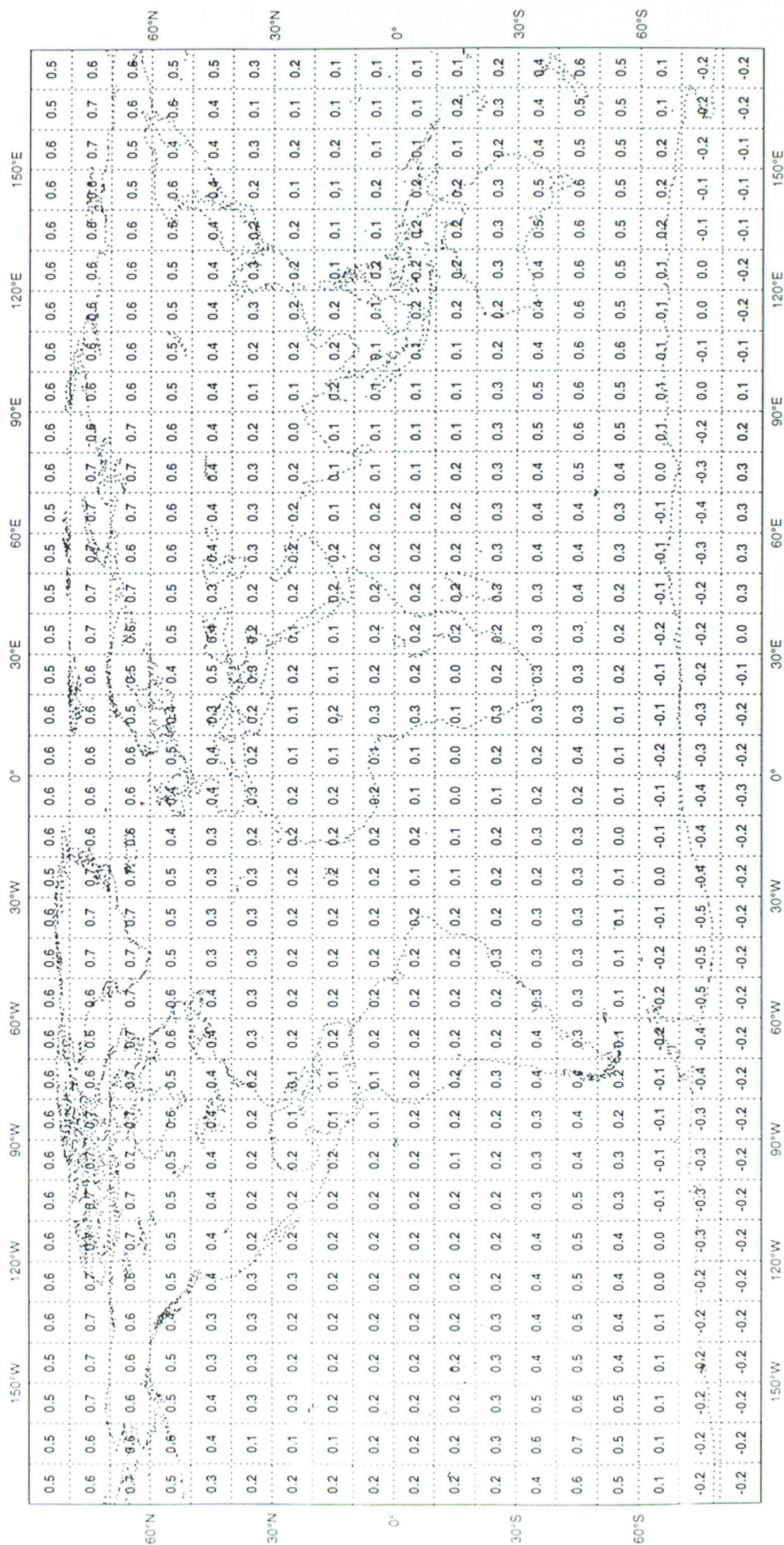
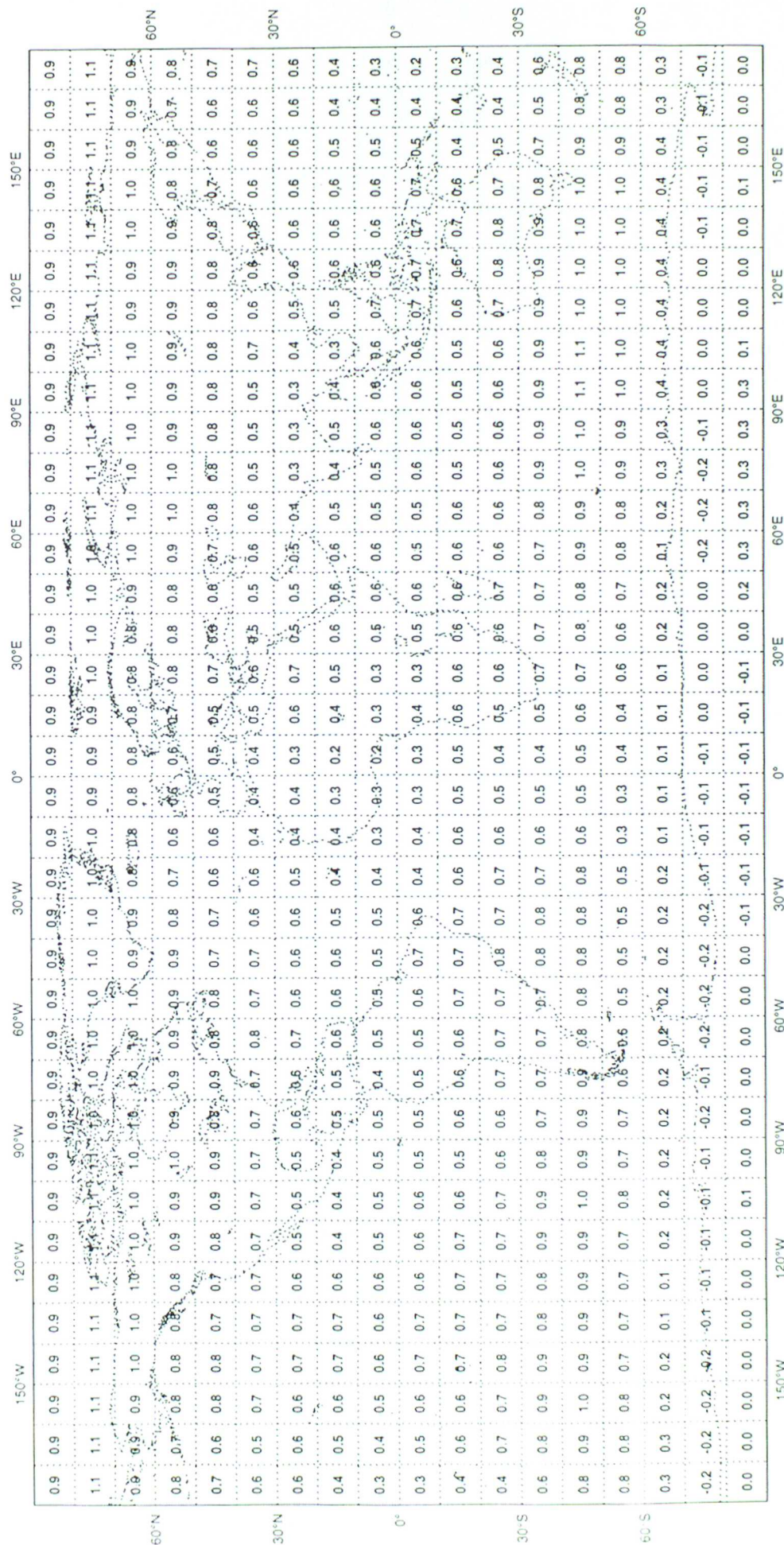


Figure 37. ATOVS SD O-B brightness temperature differences (deg C). AUGUST 2002
Channel: AMSUA-7 (300 hPa)
NOAA15, using all observations



Figure 38. ATOVS MEAN O-B brightness temperature differences (deg C). AUGUST 2002
 Channel: AMSUA-9 (100 hPa)
 NOAA15, using all observations



Global average number of observations in 24 hours = 559202

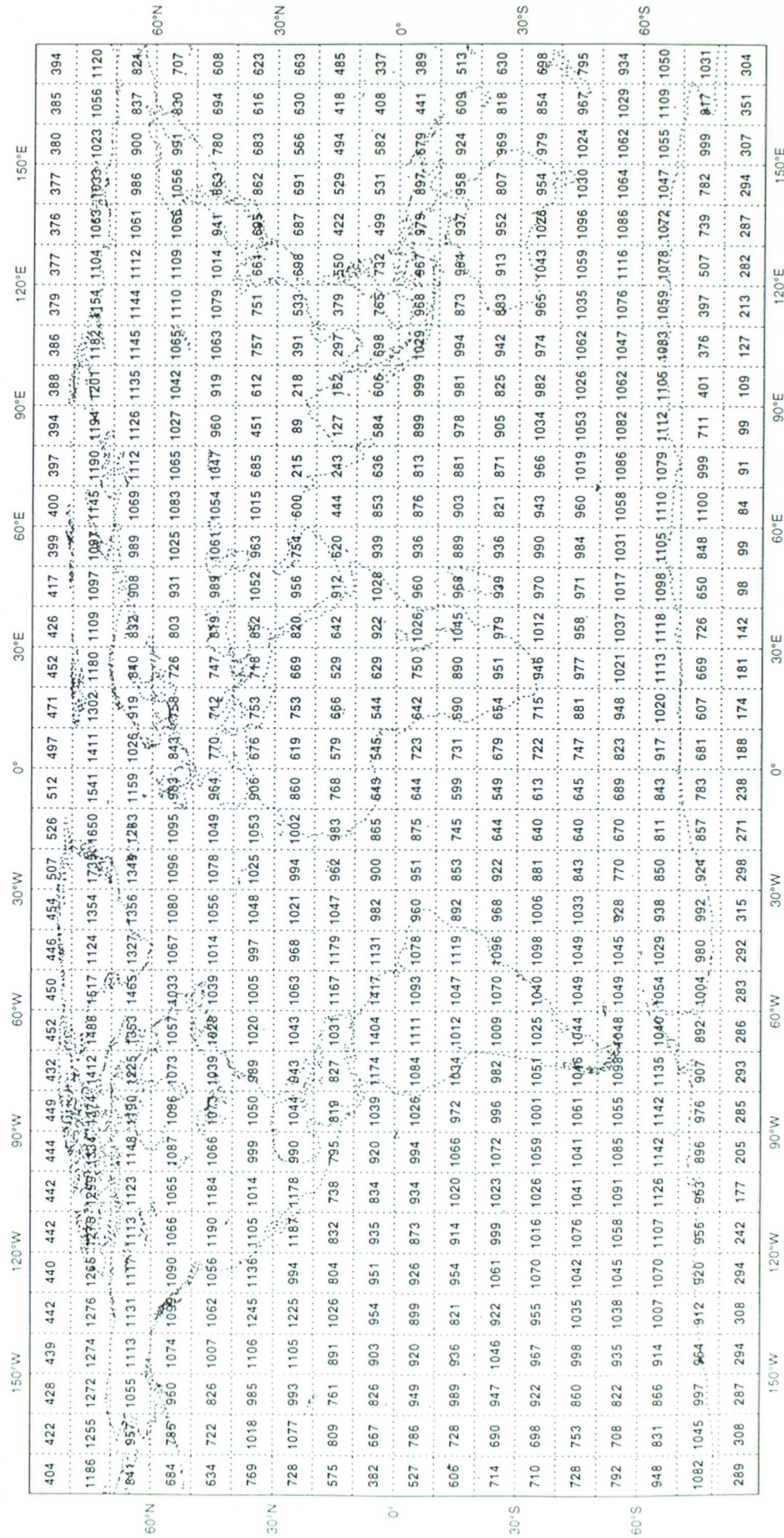


Figure 41. ATOVS MEAN O-B brightness temperature differences (deg C). AUGUST 2002
Channel: HIRS8 (Surface)
NOAA16, using all observations

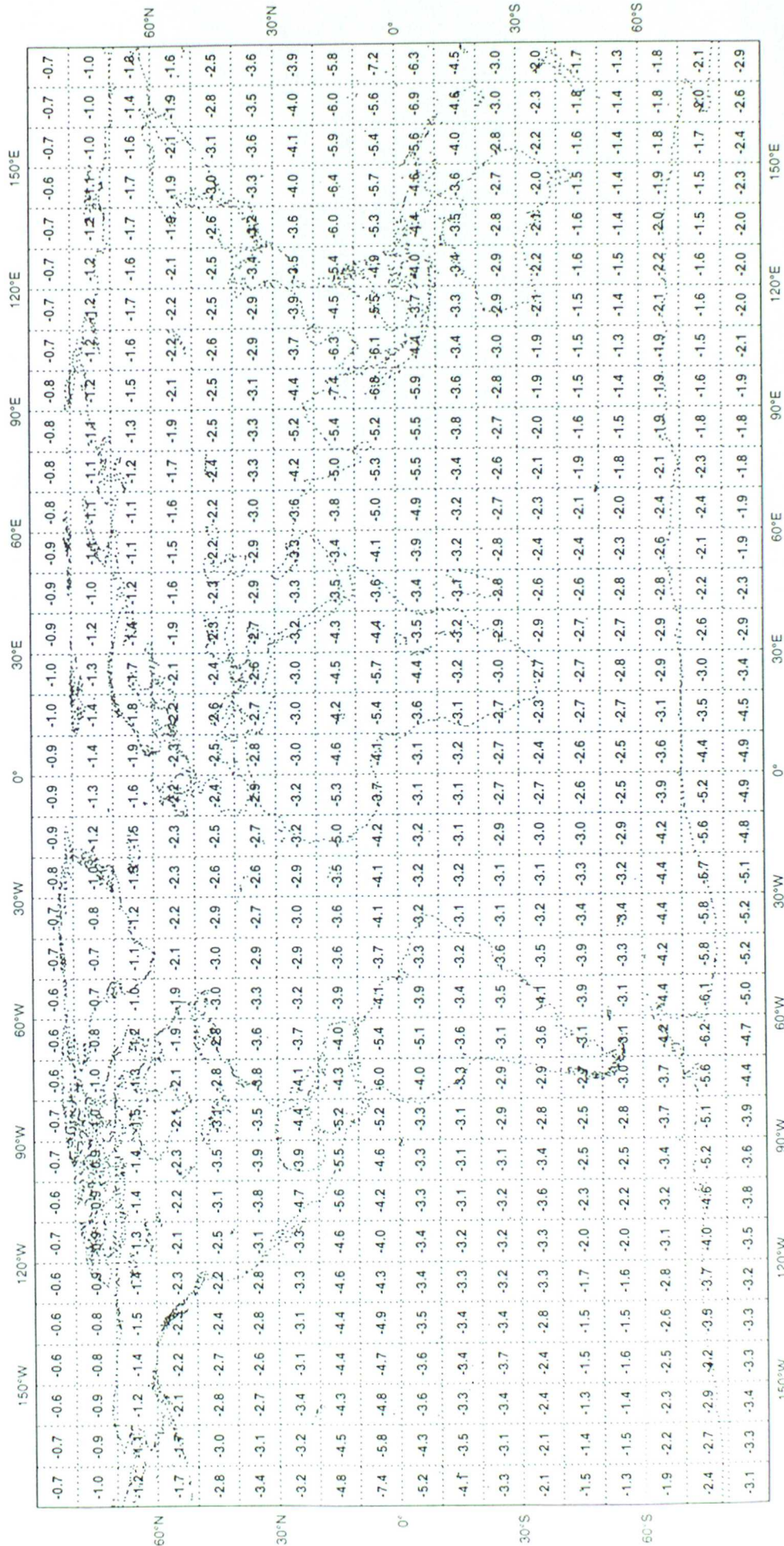


Figure 42. ATOVS SD O-B brightness temperature differences (deg C). AUGUST 2002
Channel: HIRS8 (Surface)
NOAA16, using all observations

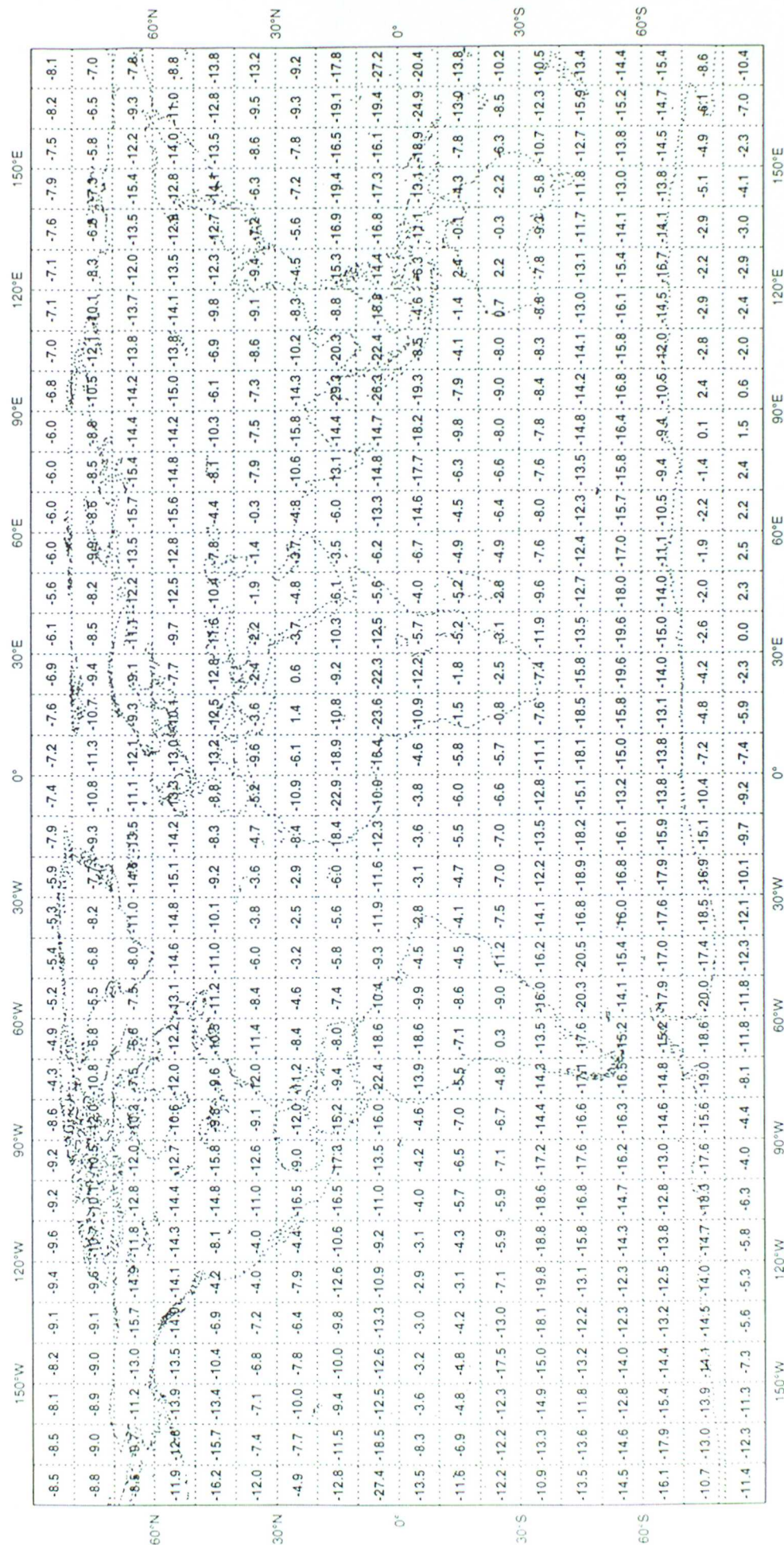


Figure 43. ATOVS MEAN O-B brightness temperature differences (deg C). AUGUST 2002
Channel: HIRS15 (700 hPa)
NOAA16, using all observations

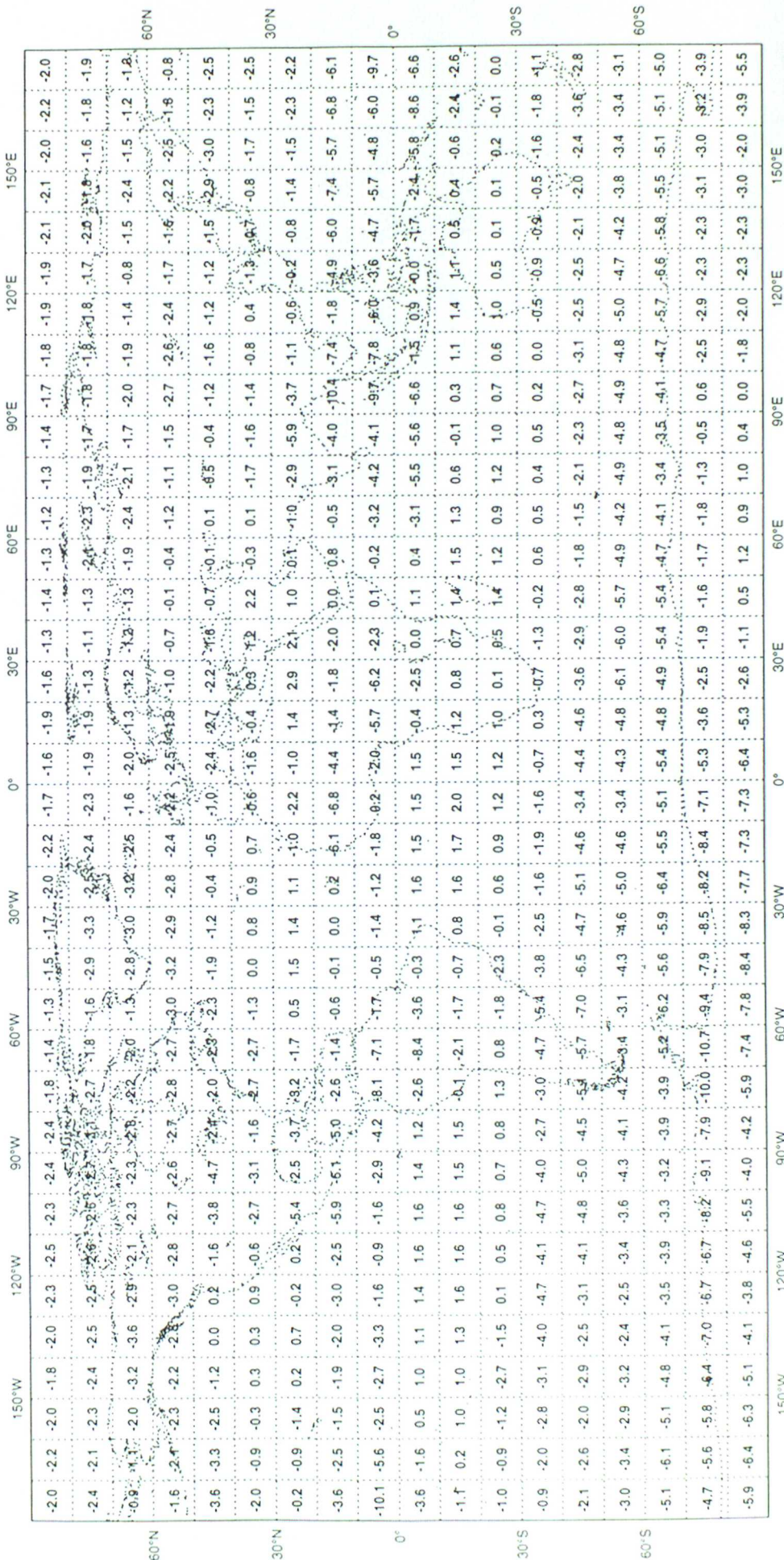


Figure 44. ATOVS SD O-B brightness temperature differences (deg C). AUGUST 2002
Channel: HIRS15 (700 hPa)
NOAA16, using all observations

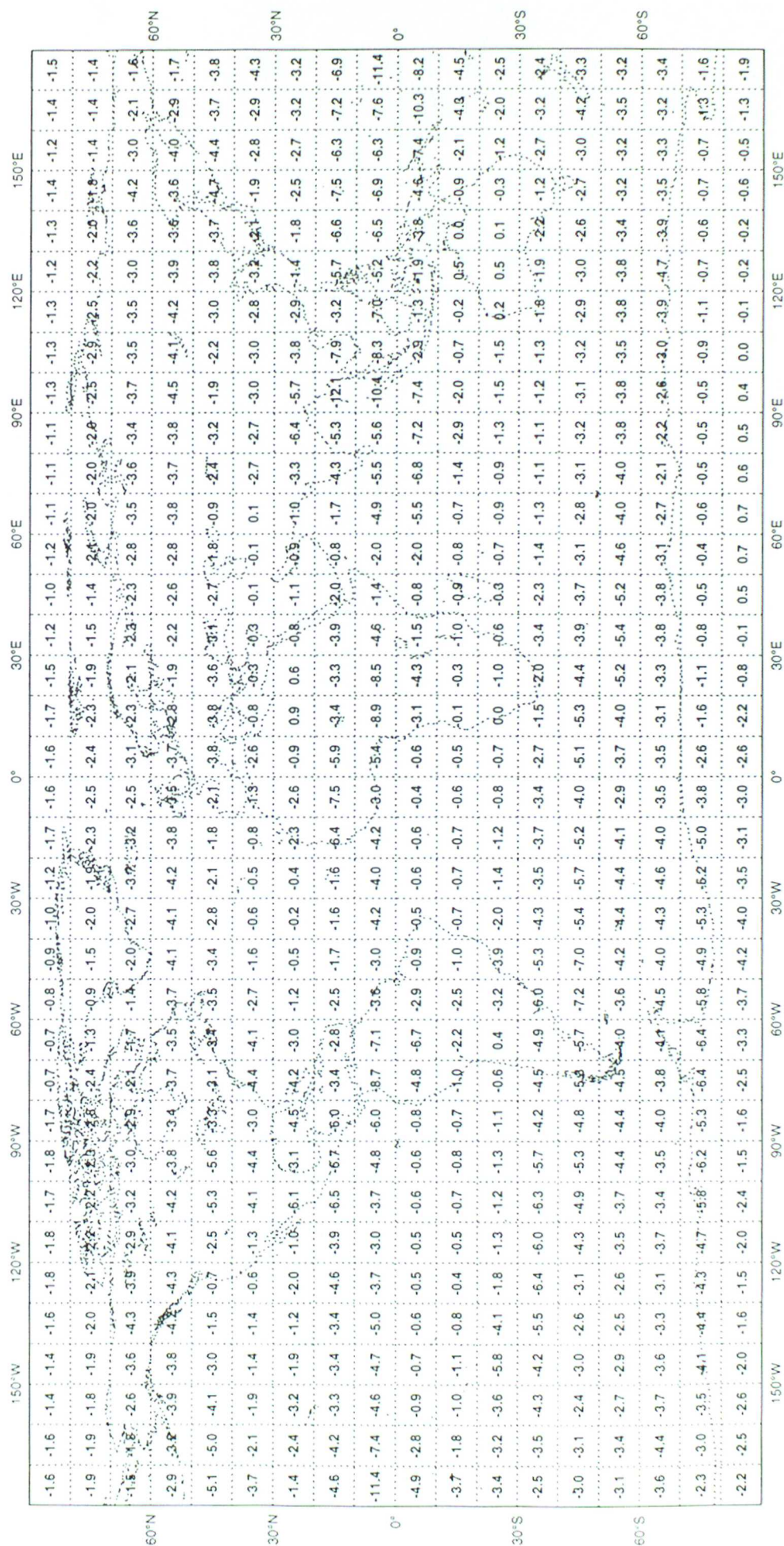
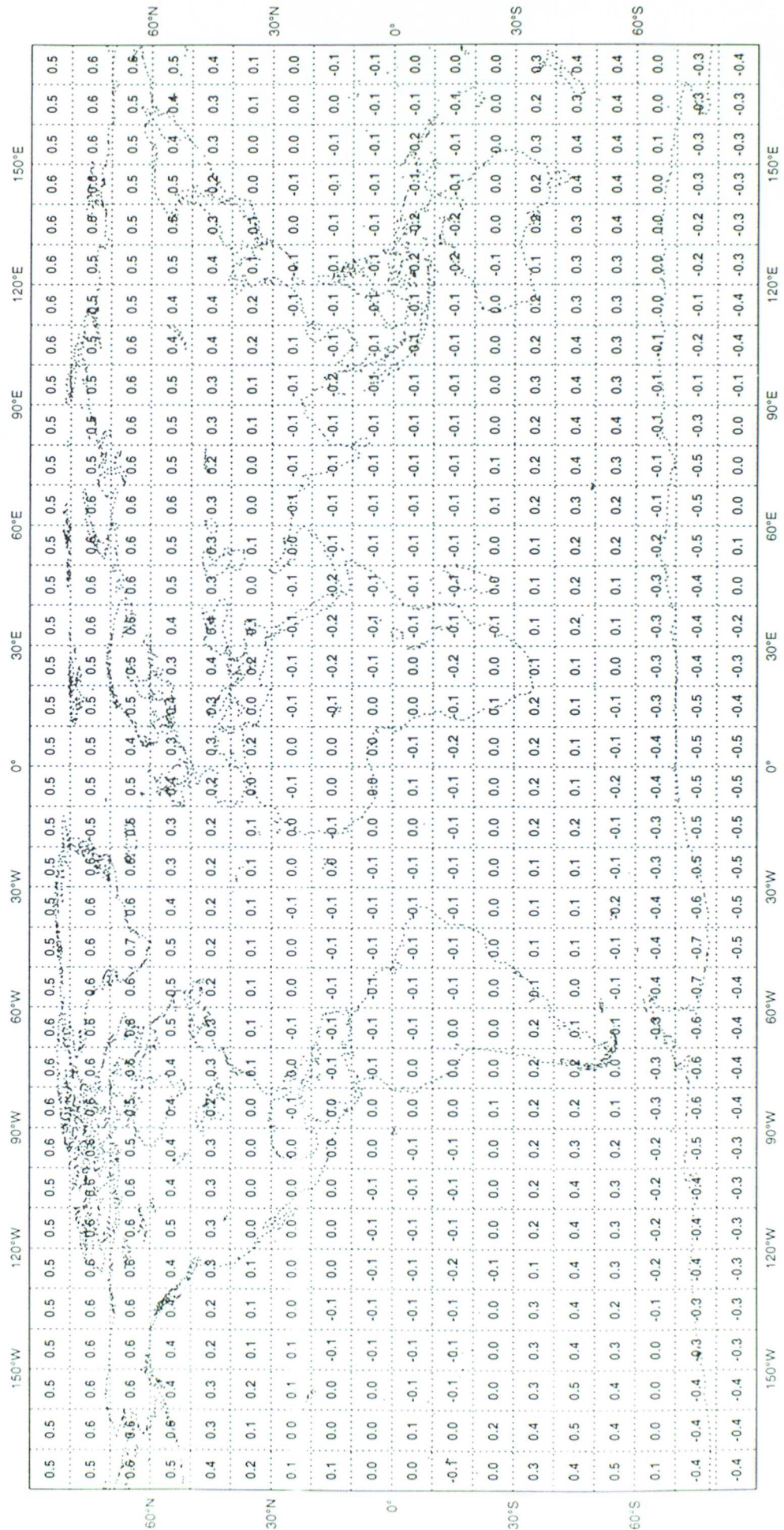


Figure 46. ATOVS SD O-B brightness temperature differences (deg C). AUGUST 2002
Channel: HIRS11 (500 - 700 hPa)
NOAA16, using all observations



NOAA16, using all observations



Figure 49. ATOVS MEAN O-B brightness temperature differences (deg C). AUGUST 2002
 Channel: AMSUA-5 (700 hPa)
 NOAA16, using all observations

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Figure 50. ATOVS SD O-B brightness temperature differences (deg C). AUGUST 2002
Channel: AMSUA-5 (700 hPa)
NOAA16, using all observations

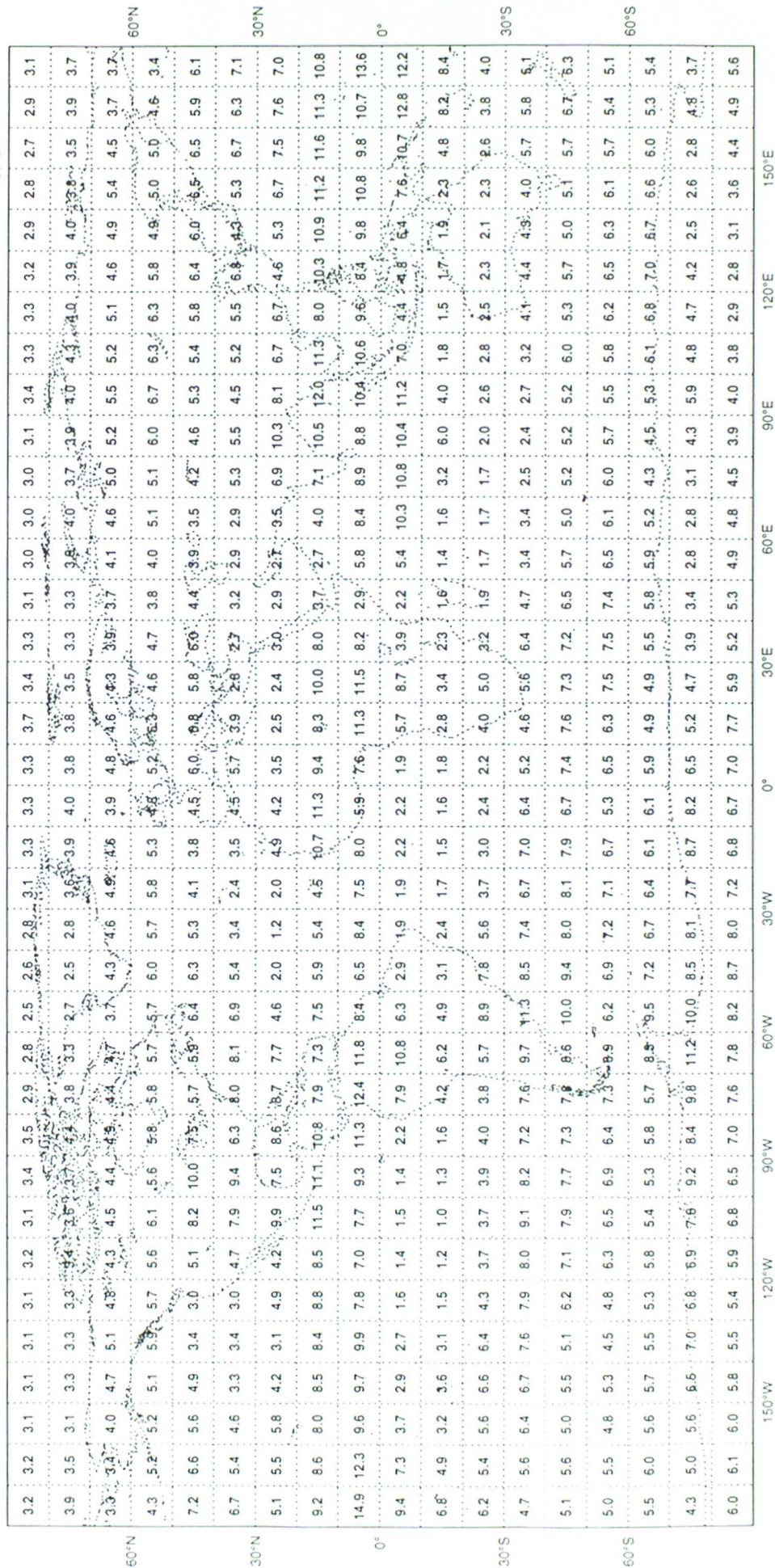


Figure 51. ATOVS MEAN O-B brightness temperature differences (deg C). AUGUST 2002
 Channel: AMSUA-7 (300 hPa)
 NOAA16, using all observations



Figure 52. ATOVS SD O-B brightness temperature differences (deg C). AUGUST 2002
Channel: AMSUA-7 (300 hPa)
NOAA16, using all observations

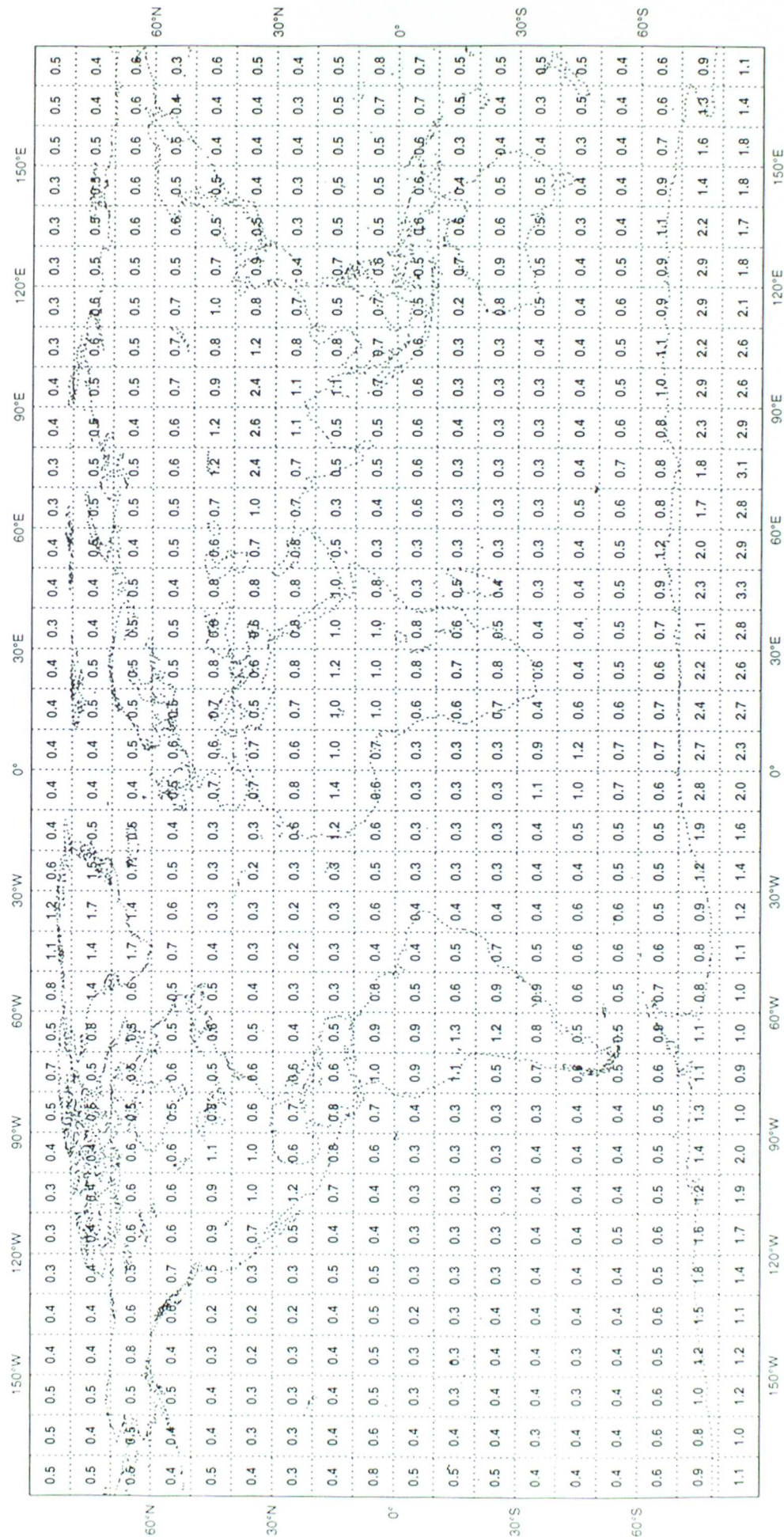


TABLE 8

MONTHLY MONITORING OF MARINE SURFACE OBSERVATIONS (COSNA)

DATA TYPE:- DRIFTER

MONITORING CENTRE: BRACKNELL

MONTH: August 2002

Monitoring procedures		
Period		:One calendar month.
Data monitored		:Reports from each unique identifier for drifting buoy.
Area monitored		:10°N - 80°N, 85°W - 0°W
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:All hours combined.
Elements monitored		:Mean sea-level pressure (hPa) :Wind speed (m s^{-1}) :Wind direction (degrees)
Parameters monitored	:NOBS	:Number of observations received excluding duplicates.
	:NGE	:Number of observations with gross errors.
	:PGE	:Percentage of observations with gross errors.
	:SD	:SD of difference of observations from background values excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values excluding those with gross errors. N.B. A positive bias indicates the wind observation is veered to the background
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors
GROSS ERROR LIMITS	:15 hPa (pressure)	
	:25 m s^{-1} (Vector Wind)	

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed $> 5 \text{ m s}^{-1}$

IDENTIFIER	LAT.	LONG.	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE									
13503	22.0	-30.9	P	90	2	6	0.4	0.0	0.4
41501	21.4	-55.1	P	125	3	21	2.1	-1.4	2.6
41503	22.8	-43.6	P	644	0	5	0.4	-0.5	0.6
41522	19.1	-43.0	P	616	0	4	0.5	0.0	0.5
41523	26.8	-45.5	P	415	0	38	0.5	0.3	0.6
41528	16.5	-59.7	P	37	0	5	0.4	-0.2	0.5
41531	25.0	-75.2	P	433	0	1	0.6	1.3	1.5
41532	23.4	-72.2	P	457	0	2	0.6	1.1	1.2
41533	25.0	-74.8	P	427	0	1	0.6	0.2	0.6
41534	22.8	-72.7	P	452	0	2	0.5	1.1	1.2
41535	21.5	-68.6	P	148	0	0	0.5	1.0	1.1
41536	22.7	-68.1	P	406	0	2	0.5	0.9	1.1
41537	25.0	-70.4	P	424	0	2	0.5	1.0	1.2
41556	19.1	-79.4	P	643	0	5	0.5	-0.4	0.7
41557	27.2	-74.9	P	67	0	0	0.6	-0.1	0.6
41559	25.1	-74.6	P	660	0	4	0.6	-0.3	0.7
41561	23.4	-59.9	P	631	0	3	0.5	-0.6	0.8
41563	21.9	-55.2	P	621	0	5	0.5	-0.7	0.8
41577	36.7	-75.6	P	973	0	36	0.5	0.6	0.8
41625	24.6	-53.3	P	96	1	5	0.4	0.3	0.5
41630	35.8	-75.7	P	630	0	20	0.5	0.7	0.9
41640	37.1	-68.0	P	952	0	34	0.6	1.8	1.9
41641	30.4	-81.4	P	795	0	34	0.9	1.3	1.6
41645	30.2	-77.6	P	628	0	3	0.7	0.3	0.7
41647	25.2	-71.2	P	621	0	5	0.6	0.2	0.6
41648	25.7	-70.9	P	671	0	11	0.6	0.4	0.7
41649	11.0	-49.1	P	607	0	5	0.5	-0.8	1.0
41650	28.7	-66.9	P	654	0	3	0.5	0.8	0.9
41652	29.3	-69.6	P	742	0	21	0.6	0.5	0.7
41656	32.1	-80.8	P	681	0	4	0.6	0.5	0.8
41657	40.0	-30.2	P	372	0	7	0.5	-0.7	0.9
41658	35.5	-51.9	P	944	0	35	0.5	-0.6	0.7
41659	32.6	-32.6	P	682	0	5	0.4	0.4	0.5
41665	40.5	-46.3	P	818	0	100	1.0	11.1	11.1
41666	38.2	-49.3	P	1010	0	36	0.7	-0.1	0.8
41667	27.6	-74.6	P	470	0	1	0.7	0.9	1.2
44504	44.8	-43.1	P	437	0	5	0.7	-0.2	0.7
44511	46.7	-42.1	P	156	0	8	0.7	-0.3	0.8
44517	44.0	-42.9	P	417	0	6	0.6	-0.3	0.7
44549	56.5	-22.9	P	1187	0	41	0.6	-0.6	0.8
44550	55.6	-19.6	P	1139	0	39	0.8	-0.3	0.9
44601	38.1	-37.5	P	1151	0	43	0.5	-0.4	0.6
44602	44.3	-52.9	P	85	0	0	0.5	-0.5	0.7
44606	36.0	-48.8	P	439	0	0	0.5	0.5	0.7
44607	42.2	-43.9	P	436	0	0	0.7	-0.4	0.8
44608	41.6	-41.2	P	438	0	0	0.6	0.7	0.9
44609	47.3	-43.4	P	434	0	0	0.7	-0.8	1.1
44610	45.2	-49.8	P	436	0	0	0.5	-0.7	0.9
44616	40.6	-18.6	P	1095	0	38	0.6	-0.5	0.8
44624	41.1	-19.7	P	731	0	5	0.4	0.0	0.5
44625	33.6	-22.2	P	712	0	1	0.4	-0.1	0.4
44627	39.4	-23.8	P	881	0	33	0.5	-0.5	0.7
44721	30.8	-43.4	P	797	0	15	0.5	-0.2	0.5
44723	44.8	-22.0	P	694	0	2	0.6	0.1	0.6
44726	57.7	-43.8	P	1262	0	44	0.8	0.0	0.8
44730	58.5	-20.8	P	1222	0	43	0.7	0.0	0.7
44742	60.4	-8.9	P	1033	0	45	2.5	-0.8	2.6
44743	62.1	-20.7	P	965	0	59	1.0	-0.1	1.0
44763	44.3	-23.2	P	945	0	27	0.7	-0.1	0.7
44764	51.5	-32.1	P	703	0	3	0.8	-0.3	0.9

IDENTIFIER	LAT.	LONG.	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
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MEAN SEA LEVEL PRESSURE

44767	51.9	-35.1	P	643	0	3	0.8	0.1	0.9
44769	54.9	-38.8	P	703	0	2	0.8	0.0	0.8
44770	53.6	-40.3	P	683	0	2	0.8	-0.5	0.9
44772	58.2	-37.6	P	671	0	3	0.8	-0.1	0.8
44773	45.0	-29.5	P	697	0	1	0.6	0.4	0.7
44775	30.1	-45.2	P	726	0	2	0.4	-0.6	0.7
44778	49.0	-1.8	P	393	0	26	0.7	-0.9	1.2
44780	55.1	-25.8	P	510	0	35	0.6	0.0	0.6
62501	32.3	-41.0	P	717	0	2	0.5	0.3	0.6
62502	48.7	-20.8	P	653	0	2	0.7	-0.4	0.8
62503	26.3	-37.9	P	847	0	17	0.4	-0.9	1.0
62504	35.1	-18.0	P	670	0	2	0.6	-0.1	0.6
62505	55.1	-33.3	P	873	0	22	0.9	-0.2	0.9
62506	45.7	-14.6	P	699	0	5	0.5	-0.8	1.0
62507	51.0	-17.7	P	684	0	2	0.7	-0.6	0.9
62508	43.3	-15.8	P	694	0	1	0.5	-0.3	0.6
62509	51.9	-20.7	P	685	0	2	1.0	0.6	1.2
62512	41.2	-14.9	P	889	0	25	0.8	-0.8	1.1
62696	54.5	-18.9	P	1088	0	36	0.7	-0.4	0.9
62697	49.0	-10.5	P	693	43	75	5.7	3.3	6.6
62711	61.3	-30.9	P	1024	0	36	0.8	0.1	0.8
62712	57.0	-34.7	P	80	0	2	1.3	0.3	1.3
64553	58.2	-22.8	P	698	0	42	0.6	-0.3	0.7
65517	60.5	-40.5	P	478	0	2	1.6	0.3	1.6

WIND SPEED

13503	22.0	-30.9	SPEED	1	0	100	0.0	12.6	12.6
41501	21.4	-55.1	SPEED	4	0	100	0.0	11.7	11.7
41503	22.8	-43.6	SPEED	641	0	100	0.9	-0.4	1.0
41522	19.1	-43.0	SPEED	615	0	100	1.3	0.1	1.3
41531	25.0	-75.2	SPEED	432	0	100	2.9	0.8	3.0
41532	23.4	-72.2	SPEED	456	0	100	2.1	-0.4	2.2
41533	25.0	-74.8	SPEED	425	1	100	2.1	0.5	2.1
41534	22.8	-72.7	SPEED	451	0	100	2.0	-0.3	2.1
41535	21.5	-68.6	SPEED	147	0	100	1.7	-0.1	1.7
41536	22.7	-68.1	SPEED	403	0	100	1.5	-0.7	1.7
41537	25.0	-70.4	SPEED	422	0	100	1.8	-0.4	1.8
41556	19.1	-79.4	SPEED	382	1	100	3.5	-1.9	4.0
41559	25.1	-74.6	SPEED	654	0	100	1.8	0.8	2.0
41561	23.4	-59.9	SPEED	621	0	100	1.5	-0.1	1.5
41563	21.9	-55.2	SPEED	608	0	100	2.6	0.7	2.7
41645	30.2	-77.6	SPEED	625	0	100	2.5	-3.2	4.1
41647	25.2	-71.2	SPEED	616	0	100	2.0	0.5	2.1
41648	25.7	-70.9	SPEED	669	0	100	1.5	0.2	1.5
41649	11.0	-49.1	SPEED	605	0	100	2.1	0.8	2.2
41652	29.3	-69.6	SPEED	738	0	100	3.5	1.7	3.9
41667	27.6	-74.6	SPEED	469	0	100	1.8	-0.3	1.8
44601	38.1	-37.5	SPEED	1142	0	100	1.8	0.1	1.8
44602	44.3	-52.9	SPEED	630	0	100	3.0	1.0	3.1
62502	48.7	-20.8	SPEED	645	0	100	1.9	0.5	2.0
62711	61.3	-30.9	SPEED	1015	0	100	2.1	0.6	2.2

WIND DIRECTION

13503	22.0	-30.9	DIRN.	1	0	0	0.0	6.4	6.4
41501	21.4	-55.1	DIRN.	4	0	0	0.0	-1.9	1.9
41503	22.8	-43.6	DIRN.	284	0	0	12.7	12.9	18.1
41522	19.1	-43.0	DIRN.	539	0	0	10.9	0.7	10.9
41531	25.0	-75.2	DIRN.	138	1	0	25.8	11.3	28.2

IDENTIFIER	LAT.	LONG.	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
WIND DIRECTION									
41532	23.4	-72.2	DIRN.	252	1	0	13.1	31.7	34.3
41533	25.0	-74.8	DIRN.	88	3	0	28.9	2.2	29.0
41534	22.8	-72.7	DIRN.	280	0	0	13.1	27.0	30.0
41535	21.5	-68.6	DIRN.	97	0	0	15.9	-13.6	20.9
41536	22.7	-68.1	DIRN.	170	1	0	24.9	51.0	56.7
41537	25.0	-70.4	DIRN.	137	1	0	21.9	-10.7	24.4
41556	19.1	-79.4	DIRN.	29	17	0	43.5	5.0	43.7
41559	25.1	-74.6	DIRN.	190	2	0	17.4	8.4	19.3
41561	23.4	-59.9	DIRN.	359	0	0	23.6	6.5	24.5
41563	21.9	-55.2	DIRN.	406	0	0	22.0	10.8	24.5
41647	25.2	-71.2	DIRN.	297	0	0	20.5	3.1	20.8
41648	25.7	-70.9	DIRN.	233	1	0	26.4	62.7	68.0
41649	11.0	-49.1	DIRN.	362	0	0	14.3	-15.6	21.2
41652	29.3	-69.6	DIRN.	167	2	0	23.2	-5.1	23.8
41667	27.6	-74.6	DIRN.	131	0	0	33.0	35.1	48.1
44601	38.1	-37.5	DIRN.	270	1	0	24.2	4.6	24.7
44602	44.3	-52.9	DIRN.	356	1	0	29.4	2.4	29.5
62502	48.7	-20.8	DIRN.	365	0	0	27.7	-6.9	28.6
62711	61.3	-30.9	DIRN.	699	0	0	18.1	-5.0	18.8

TABLE 9

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: August 2002

Monitoring procedures:		
Period		:One calendar month.
Data monitored		:Statistics for each airline carrier.
Area monitored		:40°N - 70°N, 60°W - 0°W.
Standard of comparison		:Background field from UKMO global model.
Observation times		:All hours combined.
Level(s) monitored		:300.0 - 150.0 hPa
Elements monitored		:TEMP in °C ; WIND in m s ⁻¹
Parameters monitored	:N REP.	:Number of observations received excluding duplicates.
	:PG	:Percentage of observations with gross errors.
	:PR	:Percentage of observations rejected by quality control including rejections from the duplicate check.
	:PC	:Percentage of observations with calm winds.
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.
	:BIAS	:Mean difference of observations from background values excluding those with gross errors in Temperature & vector wind.
GROSS ERROR LIMITS	:10.0 °C ; 60 m s ⁻¹ Vector Wind	
SELECTION CRITERIA	:N REP ≥ 20	

NB : All American ACARS data are grouped together and statistics are shown at the bottom of the table as "US ACARS". All ADS reports are similarly grouped together.

IDENT.	N.REP.	TEMPERATURE				N.REP.	WIND				BIAS
		PG	PR	RMS	BIAS		PG	PR	PC	RMS	
AAL	1249	1	6	1.7	0.2	1089	0	5	0	7.7	0.6
ACA	1819	1	2	1.6	-0.2	1663	0	3	0	7.0	0.2
AEA	157	1	4	1.0	0.2	41	0	7	0	4.1	0.4
AEL	381	1	13	1.7	-1.1	282	0	16	0	8.1	0.1
AFL	454	0	2	1.9	0.5	409	1	4	0	7.0	0.2
AFR	1020	1	10	1.6	0.2	818	0	11	0	7.0	0.3
AIS	163	0	14	1.6	-0.4	150	0	15	0	6.9	0.4
AJM	314	0	4	1.2	-0.2	249	0	5	0	6.5	0.3
AMM	67	0	9	1.3	0.3	61	0	10	0	7.2	-1.2
AMX	217	2	6	1.5	0.2	141	0	7	0	10.5	0.4
AUA	27	0	4	1.0	0.2	21	0	5	0	3.7	0.6
AZA	452	1	6	1.5	0.0	394	0	5	0	7.2	0.1
BAL	109	0	13	1.0	0.1	98	0	15	0	6.4	0.2
BAW	544	1	12	1.7	-0.4	516	0	13	0	6.7	0.3
BWA	58	0	0	1.3	0.2	34	0	0	0	5.1	1.9
CFG	354	0	4	1.5	-0.4	284	0	5	0	6.6	-0.4
CGA	26	0	0	1.0	-0.3	26	0	0	0	4.2	1.2
CGF	33	0	0	1.1	-0.7	33	0	0	0	4.0	0.4
CGH	77	0	0	1.3	-0.2	77	0	0	0	4.7	0.6
CLX	274	0	2	1.7	-0.4	254	0	4	0	7.2	0.2
COA	123	0	19	1.4	-0.1	79	0	27	0	10.0	-0.1
CRL	360	1	2	1.2	0.3	269	0	4	0	8.6	0.6
CUB	206	1	9	1.8	0.9	156	0	8	0	8.0	0.1
DAB	78	0	5	1.3	-0.2	77	0	5	0	4.2	1.1
DAI	83	0	1	1.0	0.1	82	0	1	0	4.2	0.6
DAL	1315	0	14	1.4	-0.4	1130	0	15	0	6.8	0.0
DBR	49	0	6	1.5	-0.3	48	0	8	0	10.0	0.6
DCE	125	1	12	1.0	0.3	109	0	15	0	7.7	-0.3
DHL	31	0	100	5.9	-5.7	29	0	10	0	12.2	0.5
DLH	961	0	11	1.4	0.1	872	0	12	0	6.7	0.5
EDW	78	0	3	1.5	-0.2	67	0	3	0	8.1	1.6
EEZ	26	0	4	1.1	0.3	22	0	9	0	7.7	1.7
EIA	145	0	9	1.6	-0.2	141	0	100	0	19.1	3.9
ELY	193	1	3	1.5	0.0	194	0	4	0	6.3	-0.1
ETH	55	2	9	1.4	0.0	57	2	18	0	10.0	0.0
EWV	113	0	4	1.4	0.2	109	1	5	0	7.0	1.3
FDX	847	0	37	1.5	0.3	828	0	38	0	8.6	0.3
FGS	96	0	1	1.4	0.3	96	0	0	0	4.6	1.1
FGZ	39	0	0	1.1	0.0	39	0	0	0	4.3	0.2
FIN	376	0	5	1.8	0.3	332	0	7	0	8.9	0.2
GAF	41	0	5	1.5	-0.8	38	0	3	0	5.5	0.2
GCO	214	0	7	1.6	0.4	213	0	100	0	12.2	2.7
GOJ	22	0	0	1.2	-0.2	22	0	0	0	3.6	-0.5
GRL	43	0	2	1.7	-0.1	32	0	0	0	3.7	0.6
GTI	133	0	11	2.0	-0.5	128	0	10	0	7.4	0.5
GWW	45	0	0	1.4	-0.2	44	0	0	0	4.5	-0.7
IBE	1013	0	8	1.4	0.5	601	0	12	0	7.4	0.2
ICE	916	1	3	1.6	-0.2	863	1	4	0	7.6	0.7
IWD	94	0	1	1.5	0.1	30	0	0	0	5.0	1.4
JMC	28	0	7	1.8	0.6	25	0	0	0	4.4	0.2
KLM	1067	0	3	1.6	0.1	823	0	3	0	6.4	0.7
LDA	39	0	13	0.9	-0.6	33	0	15	0	5.5	1.3
LDI	352	0	5	1.4	-0.6	245	0	5	0	5.8	-0.4
LIB	324	1	6	1.4	0.9	195	0	6	0	6.1	0.6
LOT	85	0	4	2.0	-0.8	77	0	4	0	8.1	0.7
LTU	509	0	6	1.4	0.2	405	0	6	0	6.8	1.0
LXR	70	3	11	1.9	0.2	57	2	12	0	6.5	1.1
MAS	32	0	3	1.9	0.7	31	0	6	0	10.5	-0.9
MON	39	3	3	1.5	0.7	29	0	7	0	7.9	-1.7

IDENT.	N.REP.	TEMPERATURE				BIAS	N.REP.	WIND				BIAS
		PG	PR	RMS	PG			PR	PC	RMS		
MPD	225	1	3	1.4	-0.1		138	0	3	0	5.8	0.3
MPH	439	0	3	1.7	-0.8		413	0	3	0	7.7	-0.3
MYT	178	1	3	1.4	-0.1		152	1	1	0	5.9	0.7
NWA	3804	0	3	1.7	0.4		3708	0	3	0	7.2	0.5
PAC	216	1	8	2.2	0.3		222	0	12	0	10.1	0.3
RAM	250	0	4	1.7	0.2		133	0	5	0	7.8	-0.4
RCH	190	4	100	2.7	0.1		176	1	100	0	14.6	2.7
RJA	37	5	24	2.7	0.2		37	0	22	0	13.0	2.2
RRR	156	0	9	2.0	0.3		130	0	11	0	10.2	-0.8
RZO	206	0	3	2.4	1.2		157	0	6	0	8.2	-0.6
SLR	156	2	14	1.1	0.3		129	1	16	0	8.1	-0.6
SSV	61	2	8	1.3	-0.5		61	0	8	0	6.7	0.3
SVA	48	6	10	1.8	-0.5		51	0	4	0	5.4	0.8
TAP	274	0	7	1.6	-0.2		126	0	10	0	8.2	0.4
THT	43	0	2	1.7	-0.3		36	0	6	0	7.6	0.4
TPA	27	0	0	1.0	0.2		24	0	0	0	5.8	-0.4
TSC	242	0	1	1.4	0.0		209	0	3	0	7.6	1.0
UAL	385	0	70	2.2	-1.0		393	0	71	0	8.2	1.2
UPS	1241	0	40	1.8	0.5		1189	1	39	0	7.5	0.4
USA	132	0	0	1.2	-0.1		110	0	4	0	8.5	0.9
VIR	289	0	2	1.6	0.0		276	0	4	0	8.5	1.3
WOA	107	0	7	1.3	0.3		99	0	9	0	9.3	-0.3
9VS	74	0	0	1.2	0.2		72	0	0	0	4.2	0.1
EU	34547	0	24	1.3	0.1		34547	0	24	0	4.7	0.3
KL	540	0	15	1.4	0.8		539	0	15	0	5.2	0.7
LH	405	0	16	1.5	0.9		405	0	16	0	4.2	0.1
TN	41	0	22	3.2	2.4		42	0	17	0	9.4	1.2
N	1172	1	10	1.5	0.2		1163	0	9	0	5.5	0.7
US ACARS	48456	6	48	1.3	0.3		48456	0	43	0	5.5	0.4

TABLE 10

**MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: August 2002**

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:100 hPa.
Element monitored		:GEOPOTENTIAL HEIGHT in metres
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.
GROSS ERROR LIMITS		:Defined in Appendix I.1

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	SD	RMS	BIAS
DASAP1	12	Z	100	7	0	10.1	18.8	15.9
DASAP3	12	Z	100	2	0	5.5	14.6	13.5
DBBH	00	Z	100	19	0	18.7	29.8	23.2
DBBH	12	Z	100	20	0	10.4	22.6	20.1
DBLK	12	Z	100	17	0	15.8	32.1	27.9
ELML7	00	Z	100	14	0	20.0	27.0	18.1
ELML7	12	Z	100	18	0	22.9	40.9	33.9
FNOR	00	Z	100	13	0	10.4	10.8	-2.9
FNOR	12	Z	100	14	0	16.3	24.8	18.8
FNOU	00	Z	100	8	0	16.8	16.8	-0.3
FNOU	12	Z	100	10	0	24.3	28.3	14.5
FNPB	00	Z	100	6	0	14.8	16.7	-7.7
FNPB	12	Z	100	8	0	31.6	31.9	4.9
FNRS	00	Z	100	8	0	27.2	30.7	-14.3
FNRS	12	Z	100	6	0	19.6	19.6	-0.5
LDWR	00	Z	100	29	0	11.3	28.8	26.5
LDWR	12	Z	100	29	0	10.2	10.3	-1.2
OVYA2	00	Z	100	3	0	11.5	16.6	12.0
OVYA2	12	Z	100	4	0	13.7	26.8	23.0
OXYH2	00	Z	100	5	0	8.4	11.7	8.2
OXYH2	12	Z	100	7	0	29.2	31.8	12.6
SWJS	00	Z	100	3	0	14.8	49.6	47.3
SWJS	12	Z	100	3	0	25.6	27.8	10.7
ZCBP6	00	Z	100	5	0	4.1	14.2	13.6
ZCBP6	12	Z	100	4	0	10.8	41.0	39.5
03953	00	Z	100	29	0	11.0	21.4	18.3
03953	12	Z	100	29	0	14.0	30.4	27.0
04018	00	Z	100	29	0	10.1	26.9	24.9
04018	12	Z	100	30	0	15.1	38.6	35.5
04220	00	Z	100	27	0	11.5	20.8	17.3
04220	12	Z	100	28	0	8.7	20.6	18.7
04270	00	Z	100	26	0	7.3	19.7	18.3
04270	12	Z	100	29	0	8.2	27.0	25.7
04339	00	Z	100	26	0	6.2	25.3	24.5
04339	12	Z	100	29	0	10.2	26.5	24.4
04360	00	Z	100	26	0	8.9	20.8	18.8
04360	12	Z	100	28	0	15.7	24.2	18.4
08001	00	Z	100	28	0	25.8	25.8	0.8
08001	12	Z	100	27	0	27.2	28.6	-8.7
08508	00	Z	100	5	0	34.2	52.5	39.8
08508	12	Z	100	27	0	19.1	43.9	39.5
08522	00	Z	100	29	0	11.7	21.5	18.0
08522	12	Z	100	28	0	11.3	23.3	20.4
08594	12	Z	100	22	0	15.2	17.8	9.2
60020	00	Z	100	28	0	12.0	25.7	22.7
60020	12	Z	100	28	0	15.0	30.8	26.9
71600	00	Z	100	28	0	13.8	19.2	13.3
71600	12	Z	100	29	0	16.2	21.1	13.6
72201	00	Z	100	29	0	20.4	46.2	41.4
72201	12	Z	100	30	0	15.9	54.3	51.9
72402	00	Z	100	27	0	21.1	51.2	46.7
72402	12	Z	100	30	0	19.1	60.0	56.9
74494	00	Z	100	26	0	18.5	24.0	15.3
74494	12	Z	100	30	0	14.7	15.7	5.4
78016	00	Z	100	29	0	10.1	32.0	30.4
78016	12	Z	100	29	0	13.9	28.7	25.1

TABLE 11

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: August 2002

Monitoring procedures:

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:500 hPa.
Element monitored		:GEOPOTENTIAL HEIGHT in metres
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.
GROSS ERROR LIMITS	:Defined in Appendix I.1	

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	SD	RMS	BIAS
DASAP1	12	Z	500	7	0	5.8	6.5	-2.9
DASAP3	12	Z	500	3	0	3.3	4.9	-3.7
DBBH	00	Z	500	19	0	9.7	9.7	0.3
DBBH	12	Z	500	21	0	7.9	9.1	-4.6
DBLK	12	Z	500	18	0	7.4	11.0	8.2
ELML7	00	Z	500	15	0	9.6	9.9	-2.2
ELML7	12	Z	500	18	0	10.2	12.8	7.8
FNOR	00	Z	500	14	0	5.4	5.8	-2.2
FNOR	12	Z	500	14	0	6.9	10.8	8.3
FNOU	00	Z	500	11	0	22.5	23.6	7.3
FNOU	12	Z	500	12	0	7.4	13.0	10.7
FNPB	00	Z	500	10	0	10.1	11.3	-5.0
FNPB	12	Z	500	10	0	16.6	18.9	9.0
FNRS	00	Z	500	9	0	13.4	13.4	0.0
FNRS	12	Z	500	10	0	14.4	15.0	4.2
LDWR	00	Z	500	29	0	12.4	17.3	12.1
LDWR	12	Z	500	29	0	18.9	19.3	-3.9
OVYA2	00	Z	500	3	0	0.5	1.4	1.3
OVYA2	12	Z	500	4	0	9.2	9.6	-3.0
OXYH2	00	Z	500	5	0	13.5	15.0	6.6
OXYH2	12	Z	500	7	0	31.0	31.3	-4.6
SWJS	00	Z	500	3	0	19.8	34.5	28.3
SWJS	12	Z	500	3	0	8.4	12.1	8.7
V2XO	00	Z	500	1	0	0.0	39.0	39.0
ZCBP6	00	Z	500	6	0	8.0	8.4	2.7
ZCBP6	12	Z	500	4	0	2.9	21.4	21.3
03953	00	Z	500	29	0	10.4	12.7	7.2
03953	12	Z	500	30	0	10.8	15.6	11.3
04018	00	Z	500	29	0	10.6	15.9	11.9
04018	12	Z	500	30	0	11.1	14.0	8.6
04220	00	Z	500	27	0	10.3	13.1	8.2
04220	12	Z	500	29	0	10.7	13.4	8.1
04270	00	Z	500	26	0	10.8	13.5	8.1
04270	12	Z	500	29	0	11.7	14.0	7.7
04339	00	Z	500	26	0	9.8	16.7	13.5
04339	12	Z	500	29	0	8.8	17.1	14.6
04360	00	Z	500	26	0	10.8	13.1	7.3
04360	12	Z	500	29	0	11.0	13.6	8.0
08001	00	Z	500	29	0	13.5	14.2	-4.4
08001	12	Z	500	28	0	13.8	15.8	-7.6
08508	00	Z	500	5	0	34.1	39.5	20.0
08508	12	Z	500	27	0	17.2	21.1	12.2
08522	00	Z	500	29	0	5.4	7.5	5.1
08522	12	Z	500	28	0	6.8	12.0	9.9
08594	12	Z	500	25	0	9.0	9.3	-2.6
60020	00	Z	500	29	0	9.2	11.1	6.2
60020	12	Z	500	28	0	8.7	12.5	8.9
71600	00	Z	500	28	0	12.5	12.8	-3.0
71600	12	Z	500	30	0	9.1	10.7	5.7
72201	00	Z	500	29	0	8.1	9.5	4.9
72201	12	Z	500	30	0	5.7	13.7	12.4
72402	00	Z	500	29	0	8.6	12.3	8.8
72402	12	Z	500	30	0	6.7	13.7	12.0
74494	00	Z	500	27	0	7.8	8.3	2.7
74494	12	Z	500	30	0	6.3	9.3	6.8
78016	00	Z	500	29	0	7.0	12.5	10.4
78016	12	Z	500	30	0	5.3	16.6	15.7

TABLE 12

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: August 2002

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:100 hPa.
Element monitored		:VECTOR WIND in m s ⁻¹
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:UBIAS,VBIAS	:Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.
GROSS ERROR LIMITS	:Defined in Appendix I.2	

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	% REJ	RMS	UBIAS	VBIAS
DASAP1	12	V	100	7	0	0	3.1	1.7	0.3
DASAP3	12	V	100	2	0	0	2.7	0.6	-2.2
DBBH	00	V	100	18	0	0	6.6	2.4	-0.9
DBBH	12	V	100	18	0	0	5.8	-1.1	0.7
DBLK	12	V	100	16	0	0	2.6	-1.0	0.1
ELML7	00	V	100	12	0	0	4.1	-1.4	1.2
ELML7	12	V	100	16	0	0	5.4	0.9	0.9
FNOR	00	V	100	14	0	0	3.4	0.4	-0.5
FNOR	12	V	100	14	0	0	3.4	0.1	-1.2
FNOU	00	V	100	9	0	0	4.1	0.0	0.4
FNOU	12	V	100	10	0	0	4.5	0.3	0.0
FNPB	00	V	100	7	0	0	3.3	1.3	1.0
FNPB	12	V	100	8	0	0	3.6	-1.7	-0.5
FNRS	00	V	100	9	0	0	3.4	0.4	-2.2
FNRS	12	V	100	6	0	0	3.3	0.0	-0.8
LDWR	00	V	100	29	0	0	2.1	-0.1	-0.4
LDWR	12	V	100	29	0	0	2.1	-0.5	0.3
OVYA2	00	V	100	3	0	0	3.6	1.8	-1.8
OVYA2	12	V	100	3	0	0	2.4	0.5	-0.1
OXYH2	00	V	100	5	0	0	4.9	1.4	-1.4
OXYH2	12	V	100	7	0	0	5.8	1.0	-2.7
V2XO	00	V	100	1	0	0	0.2	0.2	-0.1
ZCBP6	00	V	100	2	0	0	2.6	-1.0	-2.1
ZCBP6	12	V	100	2	0	0	3.4	-1.2	-1.1
03953	00	V	100	29	0	0	2.7	0.8	0.6
03953	12	V	100	29	0	0	2.4	0.1	0.1
04018	00	V	100	29	0	0	2.6	0.7	0.0
04018	12	V	100	30	0	0	2.4	0.0	0.0
04220	00	V	100	27	0	0	2.2	-0.2	0.2
04220	12	V	100	28	0	0	2.1	-0.1	-0.2
04270	00	V	100	26	0	0	2.6	0.3	-0.1
04270	12	V	100	29	0	0	2.7	0.4	0.7
04339	00	V	100	23	0	0	4.4	-0.3	-0.3
04339	12	V	100	28	0	0	4.8	0.3	0.0
04360	00	V	100	26	0	0	2.4	0.1	0.2
04360	12	V	100	28	0	0	2.6	0.0	-0.1
08001	00	V	100	26	0	0	4.2	1.1	0.7
08001	12	V	100	26	0	0	4.2	0.7	0.1
08508	00	V	100	4	0	0	2.9	0.5	-1.4
08508	12	V	100	13	0	0	2.5	-0.1	-0.5
08522	00	V	100	28	0	0	4.6	-0.9	-0.5
08522	12	V	100	27	0	0	4.4	0.2	0.0
08594	12	V	100	21	0	100	3.8	-0.2	-0.7
60020	00	V	100	28	0	3	6.5	-0.6	-0.6
60020	12	V	100	27	0	0	5.4	-0.4	0.7
71600	00	V	100	28	0	0	3.6	-0.7	0.6
71600	12	V	100	28	0	0	3.3	0.1	0.8
72201	00	V	100	29	0	0	3.4	1.6	-0.8
72201	12	V	100	30	0	0	2.7	-0.5	-0.1
72402	00	V	100	27	0	0	3.8	-0.1	-1.6
72402	12	V	100	30	0	0	3.5	-0.2	-0.6
74494	00	V	100	26	0	100	2.4	-0.3	-0.9
74494	12	V	100	30	0	100	2.4	-0.1	0.2
78016	00	V	100	27	0	0	4.2	-0.6	-0.1
78016	12	V	100	29	0	0	3.8	-0.3	0.2

TABLE 13

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
 MONITORING CENTRE: BRACKNELL
 MONTH: August 2002

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:500 hPa.
Element monitored		:VECTOR WIND in m s^{-1}
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:UBIAS,VBIAS:	Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.
GROSS ERROR LIMITS		:Defined in Appendix I.2

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	% REJ	RMS	UBIAS	VBIAS
DASAP1	12	V	500	6	0	0	1.6	0.2	0.6
DASAP3	12	V	500	2	0	0	1.2	-0.9	-0.4
DBBH	00	V	500	19	0	0	3.2	0.5	-1.4
DBBH	12	V	500	20	0	0	5.1	1.4	1.7
DBLK	12	V	500	17	0	5	10.7	-2.9	-0.4
ELML7	00	V	500	14	0	0	2.8	0.7	-0.3
ELML7	12	V	500	17	0	0	3.0	0.5	0.8
FNOR	00	V	500	14	0	0	4.3	-0.5	-1.5
FNOR	12	V	500	14	0	0	3.4	-1.1	0.2
FNOU	00	V	500	12	0	0	3.2	-0.6	0.3
FNOU	12	V	500	12	0	0	4.7	-0.6	-1.8
FNPB	00	V	500	12	0	0	3.0	-0.1	-0.2
FNPB	12	V	500	9	0	0	3.9	-1.5	-0.1
FNRS	00	V	500	9	0	0	3.8	0.2	0.5
FNRS	12	V	500	10	0	0	2.9	0.1	-0.1
LDWR	00	V	500	29	0	0	3.2	0.6	-0.4
LDWR	12	V	500	29	0	0	3.6	-0.9	-0.4
OVYA2	00	V	500	3	0	0	5.9	-0.2	-1.9
OVYA2	12	V	500	4	0	0	8.7	0.8	0.7
OXYH2	00	V	500	4	0	0	3.1	0.7	-0.5
OXYH2	12	V	500	7	0	14	13.2	1.2	-5.5
V2XO	00	V	500	1	0	0	6.0	0.8	5.9
ZCBP6	00	V	500	2	0	0	2.5	-0.1	0.2
ZCBP6	12	V	500	2	0	0	3.9	1.6	-0.6
03953	00	V	500	29	0	0	2.8	0.4	-0.4
03953	12	V	500	30	0	0	3.6	0.0	-0.4
04018	00	V	500	29	0	0	2.9	0.8	0.0
04018	12	V	500	30	0	0	3.8	-0.1	0.4
04220	00	V	500	27	0	0	3.5	0.3	-1.0
04220	12	V	500	29	0	0	4.0	0.3	-0.4
04270	00	V	500	26	0	0	3.6	0.2	0.1
04270	12	V	500	29	0	0	3.9	-0.5	0.3
04339	00	V	500	26	0	3	5.8	-0.9	0.6
04339	12	V	500	29	0	3	5.6	-0.5	-1.3
04360	00	V	500	26	0	0	4.1	0.6	0.5
04360	12	V	500	29	0	0	3.6	0.3	0.6
08001	00	V	500	29	0	0	3.9	0.7	-0.1
08001	12	V	500	28	0	0	3.0	0.1	-0.7
08508	00	V	500	4	0	0	2.2	-0.7	0.7
08508	12	V	500	13	0	0	3.5	-0.3	0.9
08522	00	V	500	29	0	0	3.2	-0.3	0.1
08522	12	V	500	28	0	0	3.6	0.0	0.1
08594	12	V	500	25	0	100	4.7	-0.6	-1.8
60020	00	V	500	28	0	0	4.9	-1.4	-0.3
60020	12	V	500	28	0	0	4.2	-0.6	-0.1
71600	00	V	500	28	0	0	3.0	0.0	-0.5
71600	12	V	500	29	0	0	3.3	0.0	0.2
72201	00	V	500	29	0	0	2.5	0.3	-0.6
72201	12	V	500	30	0	0	2.2	-0.3	0.3
72402	00	V	500	29	0	0	3.1	-0.1	-1.4
72402	12	V	500	30	0	0	2.8	-0.7	-0.8
74494	00	V	500	27	0	100	2.7	-0.3	0.2
74494	12	V	500	30	0	100	3.1	1.0	0.3
78016	00	V	500	29	0	0	3.2	0.6	-0.5
78016	12	V	500	28	0	0	3.1	0.3	-0.2

APPENDIX I

1. The gross error limits for observation minus background differences of geopotential height in Tables 5, 10 and 11 are:-

Level (hPa)	Geopotential height (metres)
1000	100
850	100
700	100
500	150
400	175
300	200
250	225
200	250
150	275
100	300
70	375
50	400
30	450

The weighted RMS values used in Table 5,10 and 11 are calculated using the following weights:-

Level (hPa)	Weight
1000	3.70
850	3.40
700	2.90
500	2.20
400	1.90
300	1.60
250	1.50
200	1.37
150	1.19
100	1.00
70	0.87
50	0.80
30	0.64

2. The gross error limits for observation minus background differences of windspeed in Tables 6,12 and 13 are:-

Level (hPa)	Windspeed m s^{-1}
1000	35
850	35
700	40
500	45
400	50
300	60
250	60
200	50
150	50
100	45